Study Guide

Level One: Protege GX Installer

Study Guide

ICT Protege GX®

The specifications and descriptions of products and services contained in this document were correct at the time of printing. Integrated Control Technology Limited reserves the right to change specifications or withdraw products without notice.

Publication Date: August 2013

Contents

Module 101:
ICT Company Profile

ICT is a world leading manufacturer of innovative and superior integrated electronic access control and security solutions. This module provides an overview of the company and its focus.

In This Module

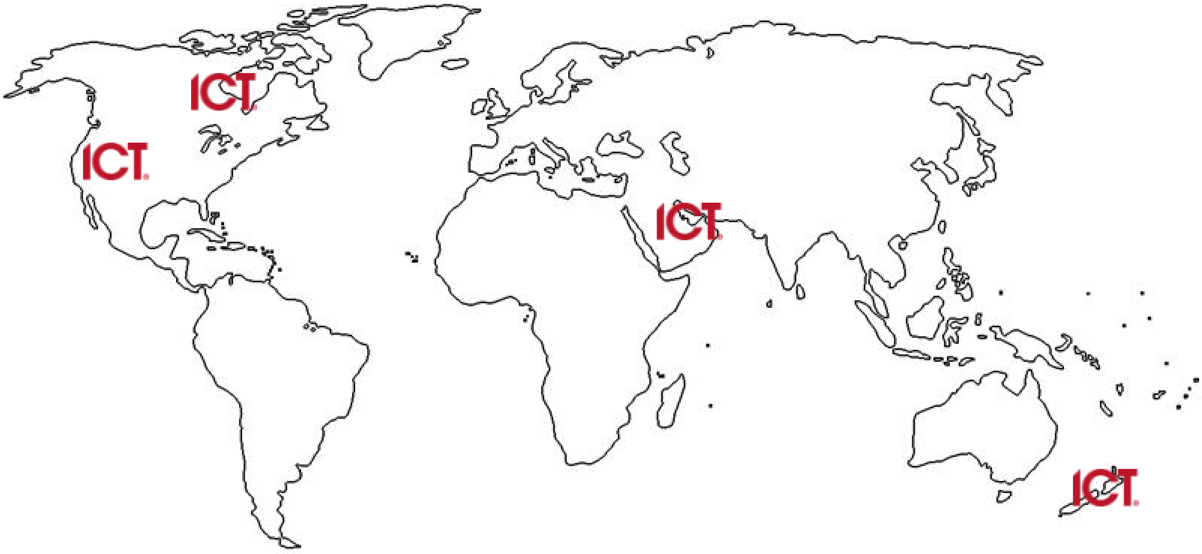
About ICT

ICT is a world leading manufacturer of innovative and superior integrated electronic access control and security solutions that enable organizations to protect their people, operations and information.

Our flagship platform Protege provides electronic access control, ID credential issuance and management; alarm monitoring, apartment management, digital video surveillance and management, real-time digital video content analysis, integration of biometric technologies, intrusion detection and smart card functionality, plus integration with a multitude of third party systems.

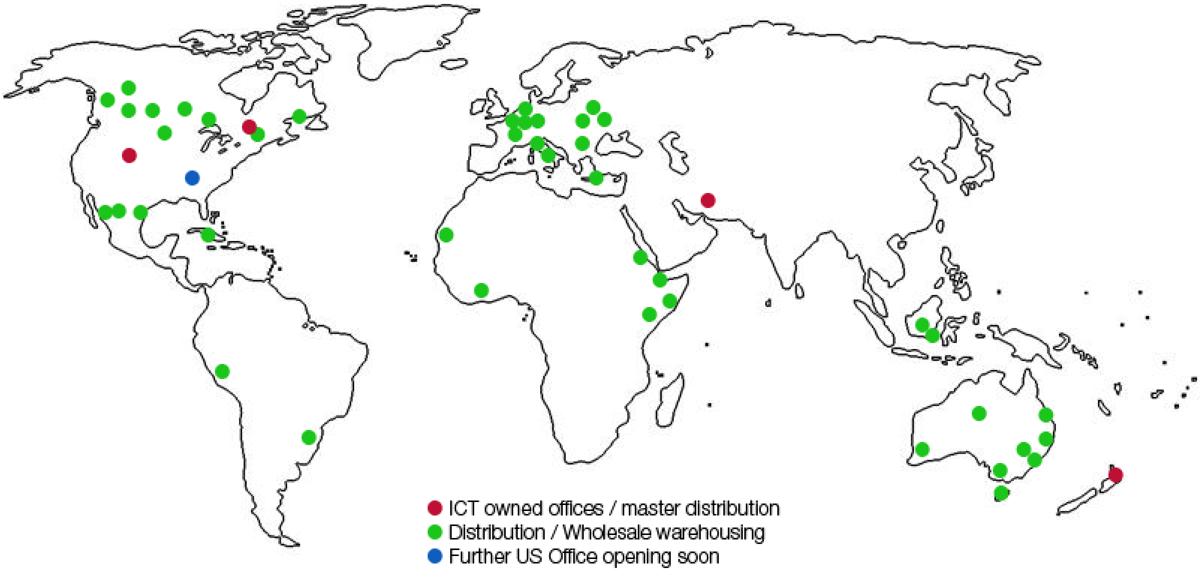
ICT also provides a range of Proximity Card Readers, IP Reporting, Apartment Management, and Wireless solutions

Locations



ICT operates 4 offices worldwide: New Zealand, Canada, USA, and UAE.

Distribution


● ICT owned offices / master distribution
● Distribution / Wholesale warehousing
● Further US Office opening soon

Customers

With thousands of system installations in over 20 countries worldwide, ICT boasts a prestigious customer base with a large number of high profile customers and a strong presence in a broad range of vertical markets.

Capabilities

- 100% production level testing to IS9000
- IPC602 L3 Board Level Manufacture
- Risk Mitigation and Disaster Recovery Strategy implementation in all locations

Research and Development

ICT operates an extensive research and development program with approximately 35% of staff dedicated to the research and development team.

- Dedicated Computer Aided Design and Computer Aided Manufacturing teams
- Embedded software engineering with expertize in a wide variety of architectures and operating systems
- Specialist VoIP and intercom development
- Windows® Development Architects and Engineers
- Radio Frequency Identification team

ICT Research and Development centers are located in New Zealand and Canada.

Production

ICT produce ALL products in our state of the art production facility located in Auckland, New Zealand.

- Full surface mount production facility capable of over 80,000 part placements per hour
- 100% testing for ALL products - no batch testing
- Boards are manufactured to IPC610 Level 3 standard with an automatic end-to-end production process

Products

ICT produces more than 260 different products.

- Protege GX comprises of 23 software modules featuring DVR integration to Automated Transaction exports with over 60 different hardware components.
- Protege SE comprises of 4 software modules and over 80 products. All SE products can be used with GX.
- We produce over 120 different card formats on to 20 different card technologies.

Certifications

- UL Certification (UL294, UL1610, UL1635)
- ULC Certification (S304, S319, S559)
- CE Compliance
- C-Tick
- EN50133 Level 3 Specification
- NIST AES256 Bit Encryption Certification

We are currently the only certified security vendor that can transmit and decode in AES256 encryption according to UL.

Solution Providers

ICT has over 4000 trained solution providers throughout the world. Our exam based training courses and certification ensures a high level of service and support with certified professionals being required to refresh certification every 12 months. This strict certification policy ensures that if you are using an accredited factory trained professional you have a solid level of service and a competent engineer.

Integration Partners: DVR/NVR Systems

Protege integrates with a number of third party DVR / NVR systems providing a full featured event based DVR and NVR solution. Operators can control Digital Video and Network Video Recorders and cameras within Protege, including the ability to view live and historical video feeds directly from event association.

Video is triggered from events for pin point accuracy. Simply right click and view the video in a separate window with full screen and keyboard shortcut control.

Link cameras to objects on floor plans and view video directly from the live floor plan view.

- Exacq
- Avigilon
- Hikvision
- Geutebrück
- Mobotix
- Integral
- OnSSI
- IVT
- March Networks
- Honeywell
- OpenEye
- Milestone
- Pelco
- Panasonic
- Dedicated Micros
- DVTel

Integration Partners: Intercom Systems

Protege enables integration with a range of third party Intercom systems to provide a complete access management solution. The Intercom service provides a direct link to the intercom solution, allowing automatic token generation for elevators, doors and control functions.

- SES (Select Engineered Systems)
- Sentex
- Viscount
- Siedle

Integration Partners: ERP/MRP Systems

Enterprise resource planning (ERP) is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete business processes. An ERP system supports most of the business system that maintains in a single database the data needed for a variety of business functions such as Manufacturing, Supply Chain Management, Financials, Projects, Human Resources and Customer Relationship Management.

ICT and the Protege System provide integration with ERP systems to allow the exchange of data between the ERP system and the electronic access control system. ICT also provides a solution for ERP systems to take advantage of tag and card issuance for use in productivity management; canteen and staff allowance systems and 'At Register Deductions' for employees.

- SAP : ICT provides integration with SAP® to perform tasks such as automatic allocation of card holder data, personnel management, card issuance, allocation of access credentials based on freight and logistics data as well as many other advanced solutions
- infor:
- Flow: Customers who already implement the Flow B2B® Software Solution can take advantage of some significant integration that allows not only HR related duties but full management of access and security functions based on process flow in your business

Review Questions

Where is ICT hardware produced?

- □ China
- □ New Zealand
- □ Canada
- □ Canada and New Zealand

Which certification applies to ICT products?

- □ UL Certification
- □ CE Compliance
- □ NIST AES256 Bit Encryption Certification
- □ All of the above

Where is research and development carried out?

- □ China
- □ Canada
- □ New Zealand
- □ New Zealand and Canada

Module 121:
Protege GX Platform Introduction

This module describes the focus of Protege GX, who it's been designed for, and what's involved in gaining Protege GX certification.

In This Module

Platform Focus

Before you begin your journey in to ICT Protege GX training, it is important that you have a good understanding of what GX is all about, why we made it, and - more importantly - where and how you should be using it.

Who is an electronic security system for?

This may sound like a stupid question but all too often integrators are losing sight of their end user and what it is that they need. It is too easy for an integrator to try and fit the end user into a box and sell them a system off the shelf.

System Ownership

On average, the installed solution will be the responsibility of:

- The Integrator for 3 Weeks
- The Operator for 4 Years
- The Owner for 12-15 Years

Focus

Protege GX was created with the end user in mind. The system gets designed around the end user's needs, providing a truly scalable system from a single door to an enterprise class system. Everything is open - the end user owns the system and their data.

Unified Interface

GX is big on integration, incorporating all of your requirements into one simple-to-use unified interface for all security requirements.

- Control multiple DVR and NVR platforms from a single platform
- Intercom integration provides a complete access management solution
- Single-point solution for monitoring and control of Building Control and Automation systems
- Transport events between multiple systems through integration with Building Management systems

Custom Operator Interface

Protege GX presents the system to the end user in a way that makes sense to them.

- Build an interface specific to your facilities needs
- Embed event lists, status lists, cameras, floor plans
- Breakout and detach any window for support of multiple monitor control rooms
- Supports up to 4 monitors per user interface

Intelligent Event Reporting

One of the simplest and most important requirements of a security system is its ability to produce useful event reports. In many systems this is often overlooked or even licensed as an additional feature.

GX makes event reporting both intelligent and easy, with a new grid view WYSIWYG reporting tool that allows you to quickly and easily find the data you are looking for. Results can be filtered, sorted, and grouped, to show only relevant information. Reports can be automatically generated at scheduled times and sent via e-mail to any operator, and data exported to a range of formats including PDF, HTML, XLS, and CSV.

Use the built-in reports, or create your own for the ultimate flexibility.

All of this is included in the base license.

System Capacity

What good is an enterprise class system if it has limits?

- Users: unlimited
- Access Levels: unlimited
- Door Groups: unlimited
- Doors: unlimited
- Floor Plans: unlimited

The software has no limits and you can add servers as the demands change. Approximately 1200 controllers are supported per server, and Microsoft clustering is supported to perform hot standby and regional failover.

Protege GX DIN Rail Controller Capacity

The physical hardware limitations of the Controller are as follows:

- Users: 5 Million
- Access Levels: Unlimited
- Inputs: 1000
- Outputs: 1000
- Doors: 64
- Areas: 128

Installer Certification

It is important to ICT to protect the image of GX. As such only certified Protege GX partners will have access to the product.

Becoming a Protege GX Partner

To become a Protege GX Partner, you must submit an application to join the ICT Dealer Network (IDN) and purchase a Protege GX Level 1 Partner Training Pack.

Training and certification of at least one technician must be successfully completed before IDN membership will be issued.

The IDN focuses on quality and not revenue targets.

Partner Training Packs

The Protege GX Partner Training Pack includes the following hardware and software:

- 1 PRT-GX-SVR Base Server License
- 1 PRT-CTRL-DIN Protege GX DIN Rail System Controller
- 1 PRT-PSU-DIN Protege DIN Rail Power Supply
- 1 PRT-RDM2-DIN Protege DIN Rail 2 Door Expander
- And all required accessories for a two-door system

It also includes two Protege GX Technician Training Packs.

Technician Training Packs

Technician Training Packs provide 24/7 access to the ICT Online Classroom for the registered user and include:

- A folder containing full course notes
- A demonstration version of the software
- ICT Connect Card providing prioritized technical support and access to exclusive member-only deals
- 1 exam voucher allowing one attempt at the certification exam
  - Vouchers are valid for 6 months from the date of purchase and a new voucher required each time an exam is sat
  - If a technician fails an exam 3 times, a facilitated course must be completed
  - Additional training packs and/or exam vouchers can be purchased as required

Certification Levels

There are three levels of Certification:

- Protege GX Installer (Level 1): Aimed at installers responsible for small to medium projects, this certification focuses on planning, installing, and configuring Protege systems to ensure successful implementation of an intruder detection and access control solution.
- Protege GX Integrator (Level 2): Aimed at integrators responsible for installing medium to large projects, this certification has a focus on system integration.
- Protege GX System Administrator (Level 3): Aimed at integrators responsible for installing enterprise level projects, this certification has a focus on high-level system programming.

Installer Certification Process

The prerequisite components are all delivered as web-based training modules. The actual course content may be completed either online or in a facilitated training course.

A Bootcamp option is also available to fast track certification with a one-day accelerated workshop to drive home the theoretical and practical elements before sitting the final certification exam.

Web Based Training

Web based training is made up of a number of short modules allowing you to study at your own pace, in your own time. Each module is made up of one or more objectives, with objectives containing a mix of slides, videos, exercises and review questions.

Once all objectives have been studied, an online module exam must be completed. These exams are timed and have a minimum pass rate of 90%. If a module exam is failed 3 times, you must undertake facilitated training to gain certification.

Certification Exam

Once all certificate modules are complete (either all online or a mixture of online and facilitated), a supervised certification exam must be taken (and passed) to gain certification.

Supervised exams must be carried out at an ICT approved facility with one practice exam available online. You must achieve a score of 80% or above to pass and if a certification exam is failed 3 times, you will have a 3 month stand-down period and must then complete a facilitated course.

Each attempt at a supervised exam incurs a charge.

Training Cost

Pricing varies according to location but included in the training pack is a range of Protege GX hardware, software, and accessories. The hardware and software may be resold to recover the cost of training, however alternative hardware must be available for any further technicians to use in conjunction with the training program.

Maintaining Certification

The Protege GX Installer certificate is valid for one year from the date of completion. Refresher training can be carried out online and a supervised recertification examination must be undertaken at an ICT approved facility prior to the expiration of the certificate to remain current. Alternatively, you can opt to advance to the next certification level by completing the relevant course and corresponding exam.

Review Questions

Who was the GX platform built for?

□ The Integrator

□ The Consultant

□ The End User

□ The Distributor

What type of system is the GX platform best suited to?

□ Single door systems

□ Systems up to 50 doors

□ Enterprise class systems

□ All of the above

Complete this statement:

WYSIWYG Event reports are...

□ A) Exportable to multiple formats

□ B) A licensable feature

□ C) An intuitive way of finding the data you want

□ D) A and C

How many users are supported by the system / controller?

□ Unlimited / Unlimited

□ Unlimited / 2000

□ 2000 / 2000

□ Unlimited / 5 Million

Who can purchase Protege GX hardware / software?

□ Integrators who have at least one Certified Protege GX Installer

□ Integrators who maintain a predefined level of sales

□ Integrators who are paid members of the Protege GX Installers Group

□ All of the above

Where do certification exams take place?

- □ Web based, self paced
- □ Only at the ICT factory
- □ Supervised at the Integrators office
- □ Supervised at an ICT approved facility

Module 122:
Protege GX Licensing

This module outlines the Protege GX licensing structure, describes which items and features are included in the base license (and which must be licensed separately), and explains the importance of an SMA and how it is charged.

In This Module

Licensing Structure

Protege GX uses a modular licensing model which is both flexible and scalable. This enables you to purchase only the features you need, yet easily extend your system by adding additional features as you need them.

The larger the system the higher the premium, however a ceiling (or license cap) prevents runaway license costs. Once this cap is reached, the total number of that item becomes unlimited.

- Total number of licensed doors capped at 1000
- Total number of licensed cameras capped at 250
- Total number of licensed IP doors capped at 1000
- Users and Controllers are unlimited meaning unrestricted growth in an enterprise

License Facts

- Not a revenue grabbing exercise
- Enables small solutions to be more cost effective
- Enterprise class solutions must grow with an enterprise
- The larger the system the higher the premium. However a ceiling (cap) prevents runaway license costs

License Duration

- Purchased licenses are valid for 20 years
- Training or Demo licenses are valid for 3 months

Base License

The base Protege GX Server License (PRT-GX-SRVR) is required for all installations and includes

- 1 concurrent Protege GX Client connection
- 50 Doors
- 10 Cameras
- Unlimited DVRs
- Unlimited sites
- Unlimited controllers
- Unlimited areas
- Unlimited operators
- Unlimited users

Additional client, door, and camera licenses can be purchased to extend the base configuration. These are only required when exceeding the base license quantity. For example, a site requiring 5 concurrent operator logins, 75 doors, and 30 cameras would need a base license, 4 additional client connection licenses, 25 additional door licenses, and 20 additional camera licenses.

Included Features

The base license includes the following features:

- Floor plans
- Event reports
- Grid view reports
- Email reports
- Bulk user import

Licensed Items and Features

Additional licensable components are available based on your needs.

Doors

The base license includes 50 doors. If additional doors are required, further door licenses can be purchased in blocks of 50, 10 or as a single item, with bulk purchases being more cost effective.

Doors have a cap or "top out" limit of 1000. Once this limit has been reached, the number of doors allowed becomes unlimited. This means that the maximum number of additional door licenses ever required (in addition to a base license) would be 950.

The number of licensed doors applies to the **server**, not the site or controller. So if you have 8 sites with 10 doors each, the system determines this as 80 doors, and would require an additional 30 doors in addition to the base license.

IP doors are purchased separately.

Cameras

The base license includes 10 cameras. If additional cameras are required, further camera licenses can be purchased in blocks of 10.

Cameras have a cap or "top out" limit of 250. Once this limit has been reached, the number of cameras allowed becomes unlimited. This means that the maximum number of additional camera licenses ever required (in addition to a base license) would be 240.

The number of licensed cameras applies to the **server**, not the site or controller. So if you have 8 sites with 5 cameras each, the system determines this as 40 cameras, and would require an additional 30 cameras in addition to the base license.

The camera license covers the video to Protege GX component. HLI is licensed separately and covers the exchange of events between Protege GX and the DVR.

The number of DVRs is not restricted.

Concurrent Operator Connections

Protege GX uses a concurrent usage license model enabling you to install the Protege GX Client on any number of workstations, with the restriction being on the number of operators that can connect at any one time.

The base server includes one Protege GX Client (operator). Use additional client licenses to increase the number of concurrent operator connections that can be made.

IP Doors

IP Doors (Salto, Sargent, and Kaba) are purchased separately in blocks of 10 or as a single item, and allow the connection of IP software doors to the system.

The number of licensed IP doors applies to the **server**, not the site or controller. This means if have 8 sites with 10 IP doors each, you require 80 IP doors.

SIP

An SIP license enables the GX client to communicate directly with IP intercoms.

This feature is licensed per connection point.

DVR HLI

A DVR HLI (High Level Interface) license enables bi-directional communication between Protege GX and an NVR or DVR platform. Note that this is separate to the live and archived video display which is covered with a camera license.

- Inserts events in to the Protege GX event log
- Actions are sent to the DVR or NVR platform in response to events in Protege GX
- Operates with only GOLD level integrations

This feature is licensed once and enables HLI for an unlimited number of DVRs.

Active Directory (LDAP) Users

This feature enables you to import Active Directory users into a site based on the Active Directory group that has been selected, and to synchronize them every 10 minutes.

This feature is licensed once and allows an unlimited number of Active Directory users.

Active Directory (LDAP) Operators

This feature enables you to use Active Directory for operator management allowing operators to login automatically using their Windows credentials.

Active Directory details are configured under the operator record. Once defined, the operator can select the option to use Windows Authentication.

This feature is licensed once. The number of operators that can connect at one time is limited by the Concurrent Operator Connection license.

Muster Reports

This feature provides the ability to create lists of people currently in a defined area. It is ideal for creating an evacuation list of who is on site when a fire alarm is triggered. You can have multiple lists for different areas.

This feature is licensed once.

Photo ID

A Photo ID license provides the ability to create and manage users Photo ID badges from within Protege GX.

This feature is licensed once.

Protege GX SDK

An SDK license allows programmers to interface with Protege GX:

- Receive status updates
- Control devices
- Add users and assign access levels

This feature is licensed once.

Time and Attendance

This feature provides the ability to report on employee attendance, including early or late arrivals, early or late departures, exceeded break times, and total hours worked.

This feature is licensed once. You can use a single or multiple readers for logging staff movement.

Video Verification

This feature displays a popup window showing live video footage when a user badges at a door to request access. The operator can compare video footage with stored image for verification, and grant or deny access.

This feature is licensed once.

CSV Schedule Import

The ability to import users from a CSV file is included in the base license, however it is a manual process so best suited to the initial setup of users

The licensed feature allows you to import on a schedule (every hour, day, week, etc) enabling you to create a low level integration to a third party system. For example, a storage facility may use software that lists all the people that are permitted access. This feature allows you to import that list on a defined schedule, automatically creating new users in the Protege GX system

This feature is licensed once.

Email on Event

This feature enables the Protege GX Server to send an email to a pre defined user on a pre defined event. For example, emailing a muster report to the fire marshall automatically when a fire alarm is activated, or notifying a building manager when access is granted (or denied) to a secure door.

This feature is licensed once.

Server License

The Protege GX license is bound to the server. Each time a license request is generated, it takes a complete hardware profile of the server. Any significant change in the hardware profile requires a new license activation. System specifications must be met, and may be checked when your server is licensed.

If using Protege GX in a virtual environment (such as VMWare), the MAC address of the virtual machine must be fixed otherwise your hardware profile will keep changing.

When to license your server

Your server license must be updated after:

- The server software installation is complete
- An additional licensed feature is purchased
- A software upgrade requires the Protege GX software to be uninstalled
- The server hardware profile changes

When the server hardware profile changes, ICT must be contacted to request an additional license activation. The reason for the hardware change will be logged, as will the change in hardware profile.

Licensing Process: Automatic

Licensing your server is a simple task if you have internet access

1. Open the Protege GX application
2. If your server has not been licensed yet, you will be prompted to update your license.
3. Go to the **License Update** tab (About > License > License Update)
4. Click **Download License**
5. If your server internet access is via a proxy server, you will need to set this up in the Proxy Setup tab
6. Enter your SSN, Site details and Installer details and click **OK**

Once your License has been successfully installed, you then need to close and restart the user interface

Licensing Process: Manual

If you do not have internet access you will need to manually license your server.

1. Open the Protege GX application and go to the License Update tab (About > License > License Update)
2. Click Generate License. You will be prompted to save a license request file
3. Take this license request file to a PC with internet access
4. Open a web browser to http://www.incontrol.co.nz/license/ or browse to Support > Software Registration > GX Registration Form from the ICT website
5. Enter your Site details, Installer details and SSN, then browse to the license request file
6. You will now be prompted to save a license file
7. Take this license file back to your server and click the browse button on the License Update page
8. Select the new license file and click OK

Once your License has been successfully installed, you will need to close and restart the user interface

Software Maintenance Agreements (SMAs)

At ICT, we take improving and maintaining our software very seriously. A Software Maintenance Agreement (SMA) is designed to provide the best support possible on all our products.

Why Maintaining an SMA is Important

A Software Maintenance Agreement is an agreement between ICT and the end user and must be purchased through an ICT approved integrator. It provides the end user with access to new features, updates, enhancements and fixes, and priority access to technical support. This protects the investment the end user has made in the software, and funds ICT's continuing Research and Development program.

Cost and Duration of an SMA

All licenses are sold including an annual SMA.

This is renewable 12 months following the initial software registration and is calculated at 25% the current cost of the licensed software. Renewing an SMA is not mandatory, however you will not receive important updates or be able to upgrade or add client licenses once the SMA has expired. The SMA can be renewed at any time, however you will be charged for the annual agreements going back to the initial date of expiry. For example, if your SMA expired in November 2008, you would need to pay the annual charges from this date forward and at the current SMA rate. You can also choose to purchase an SMA in advance to take advantage of current price structures and avoid any potential price increases.

Example SMA Calculation

For a system of 111 doors, the following calculation would be made each year:

Base License	$1000
50 Door License	$1000
10 Door License	$500
1 Door License	$100
Total	$2600
Annual SMA (25 % of Total)	$650

Note: These are not the true license costs, and have only been used to show a simple calculation.

Example SMA Calculation After Expiry

Scenario: Software was purchased in January of 2010, including SMA which expired in February of 2011. It is now July 2012.

One years SMA would take the system to February 2012, therefore **two** years is required to get a current SMA expiring in February 2013

Base License	$1000
50 Door License	$1000
10 Door License	$500
1 Door License	$100
Total	$2600
Annual SMA (25 % of Total)	$650
Total SMA Cost (2 Years)	$1300

Note: These are not the true license costs, and have only been used to show a simple calculation.

Review Questions

What is the license cap for doors?

□ 250

□ 500

□ 1000

□ Doors are unlimited

What is the maximum number of Controller licenses you will ever pay for?

□ 250

□ 500

□ 1000

□ Controllers are unlimited

What happens when the number of cameras reach 250?

□ No more cameras can be added, the cap has been reached

□ Cameras are now unlimited

□ Nothing, the camera cap is 500

□ No difference, cameras are not limited anyway

How many camera licenses are included in the base license?

□ None

□ 5

□ 10

□ Cameras are unlimited

Which of the following features are NOT included in the base license?

□ Floor plans

□ DVR HLI (High Level Interface)

□ Grid View reports

□ CSV bulk user import

How many operators can log in at the same time with a base license?

- □ As many as you like, operators are unlimited
- □ 1
- □ As many as you like, users are unlimited
- □ 10

To connect 20 PTZ cameras and have them respond to events automatically, what would be required?

- □ 10 camera licenses and a DVR HLI license
- □ 10 camera licenses, DVRs are unlimited
- □ A base license, 10 camera licenses and a DVR HLI license
- □ A base license, 20 camera licenses and a DVR HLI license

Which licensed feature(s) are required in order to enable operators to login to the Protege GX Client using their Windows credentials?

- □ An Active Directory (LDAP) Users License
- □ An Active Directory (LDAP) Operators License
- □ A Concurrent Operator Connection License
- □ All of the above

Which license would I require for a system with 100 IP Doors?

- □ A base license and 50 Door licenses
- □ A base license and 100 Door licenses
- □ A base license and 100 IP Door licenses
- □ A base license, 100 IP Door licenses and 50 Door licenses

To what is the Protege GX license bound?

- □ The Integrator
- □ The Site
- □ The Server
- □ The Protege GX database

Which of the following circumstances would NOT require a license update?

- □ Restoring an old Protege GX database
- □ Adding 150 door licenses
- □ Replacing the server motherboard
- □ Upgrading Windows on the server

Do you need to have Internet access to update your license?

- □ No, you can do a manual license update
- □ Yes, the automatic license update connects to the ICT licensing server via the internet
- □ Yes, even with a manual license update, you will need internet access somewhere to upload the license request and download the license file
- □ No, the proxy server can provide your license update

Which of these statements is NOT correct?

- □ An SMA provides access to new features, updates, enhancements and fixes
- □ An SMA is an agreement between ICT and the Integrator
- □ The end user must purchase their SMA from an ICT approved Integrator
- □ An SMA provides priority access to technical support

If an SMA expired 30 months ago, how much would it cost to renew?

- □ It will be 25% of the current cost of the entire license x 1 year
- □ It will be 25% of the current cost of the entire license x 2 years
- □ It will be 25% of the current cost of the entire license x 3 years
- □ It will be the same cost as a new license

Calculate the following:

If you had a system with a base license and a total of 1050 doors, how much would an SMA cost if the base license was $1000, and door licenses were $1000 for 50?

- □ $5500.00
- □ $5250.00
- □ $5000.00
- □ $4500.00

Module 123:
Protege GX System Architecture

Before looking at the hardware or software, it is important to have a good understanding of how the overall system fits together. This module provides an overview of the Protege GX system and its architecture.

In This Module

The Protege GX Server

Protege GX is built around a central server and one or more Protege GX Controllers.

The Server is responsible for maintaining the system configuration and monitoring, while Controllers are responsible for the physical control and operation of the system.

Network Connectivity

While the controllers are designed to run standalone, network connectivity is required between the central server and the controller(s) to enable configuration and monitoring of the system.

Databases

The Protege GX Server contains two databases:

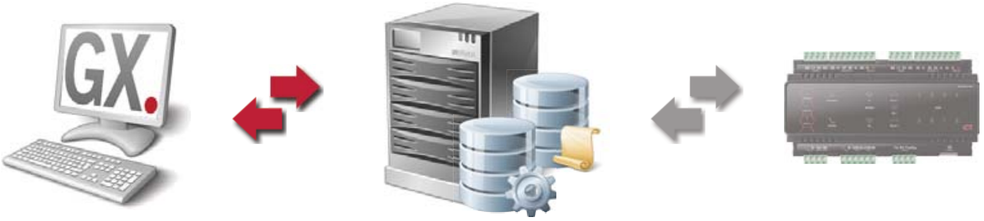
1. The Protege GX database which contains the configuration for the entire system including global settings, operators, workstations, right down to the physical configuration of the Controllers and associated doors, readers, inputs and outputs.
2. The Protege GX Events database which stores the events from all Controllers and the server. These events are used for live monitoring of the system, triggering system alarms and reporting.

Both databases run on Microsoft SQL Server.

Protege GX Client Software

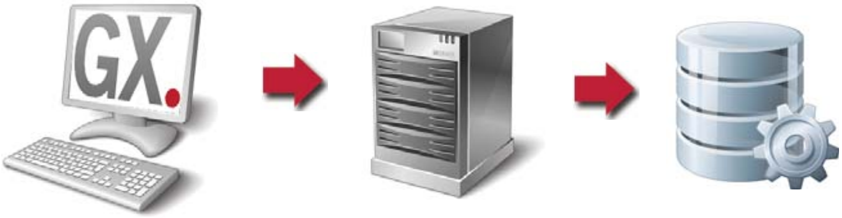
The client software is used for the configuration and monitoring of the Protege GX system. The client communicates with the Server using TCP/IP.

The client software only ever communicates with the **Server**, never directly with the Controller(s).



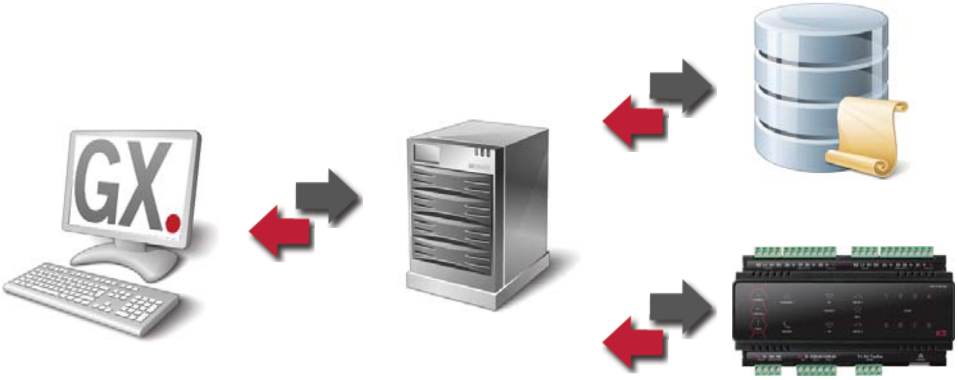
Configuration Changes

For **configuration changes**, the client software makes changes to the Protege GX database.



System Monitoring

For **system monitoring**, the client software requests information from the server, which in turn retrieves events from the Protege GX Events database and directly from the Controller(s) as required.



Client Setup

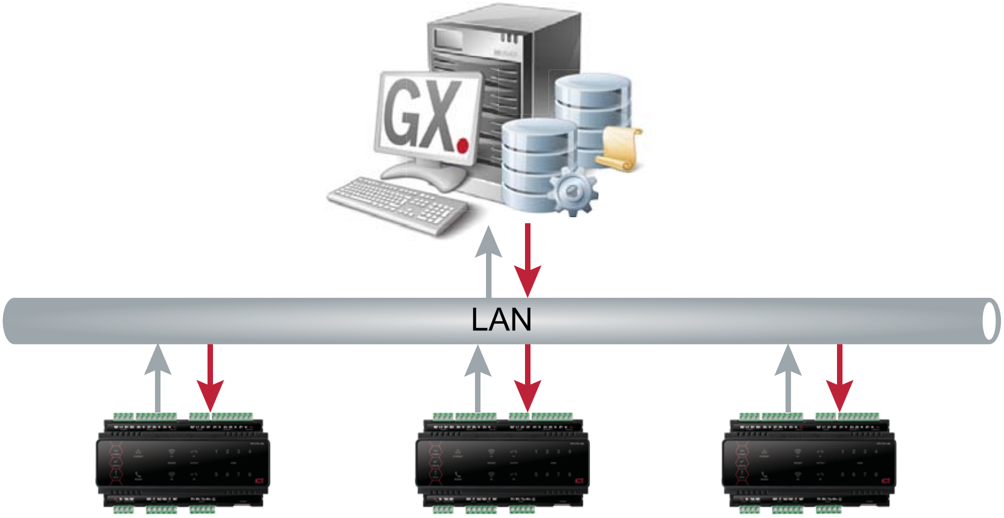
Client software is usually installed on the same machine as the Protege GX Server. This allows the entire system (including configuration and monitoring) to run on a single PC.

Client software can also be installed on as many other workstations as you like. Licensing only limits the number of concurrent connections to the server, not the number of PCs with the software installed.

Network Architecture

The Protege GX Server uses TCP/IP on an Ethernet network to communicate with Protege GX Controllers.

The Server sends configuration changes, control commands, status requests and firmware updates **to** the Controllers



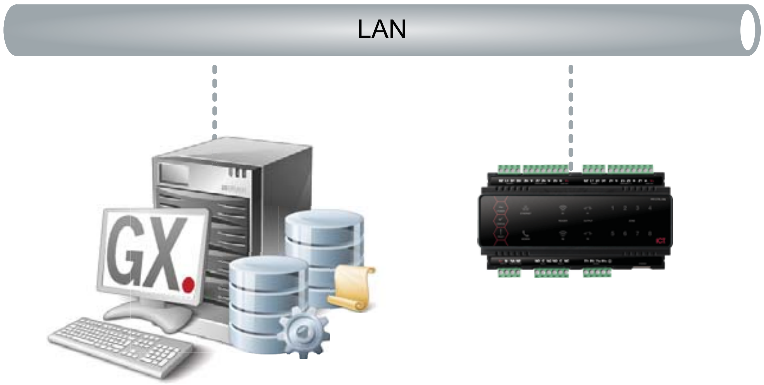
The Server receives events and status updates **from** the Controllers.

Scalability

The Protege GX system was built with scalability in mind and is suitable for single controller sites right through to enterprise scale systems that span large geographical areas.

Small Sites / Single Controllers

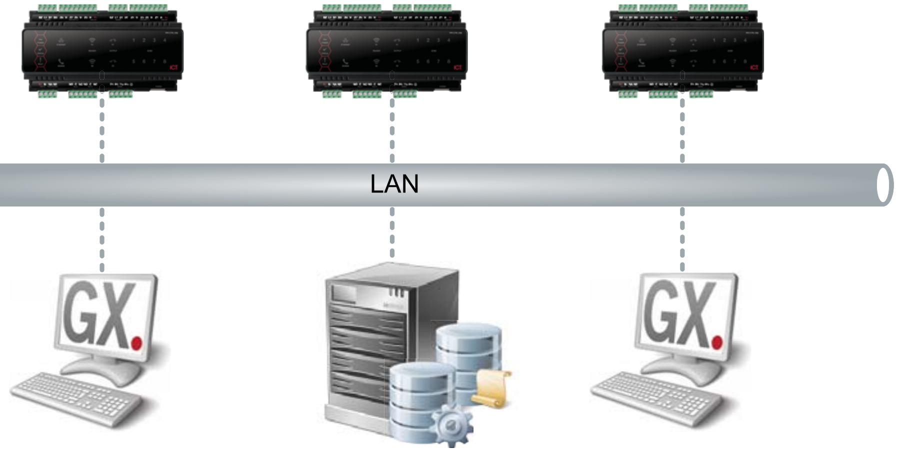
For smaller sites, consider installing the software on a PC that is also used for other functions, or on a laptop that is permanently housed in the same cabinet as the controller.



The example above shows a small system with a single controller and a client and server installation all on a single PC.

Large Sites / Multiple Controllers

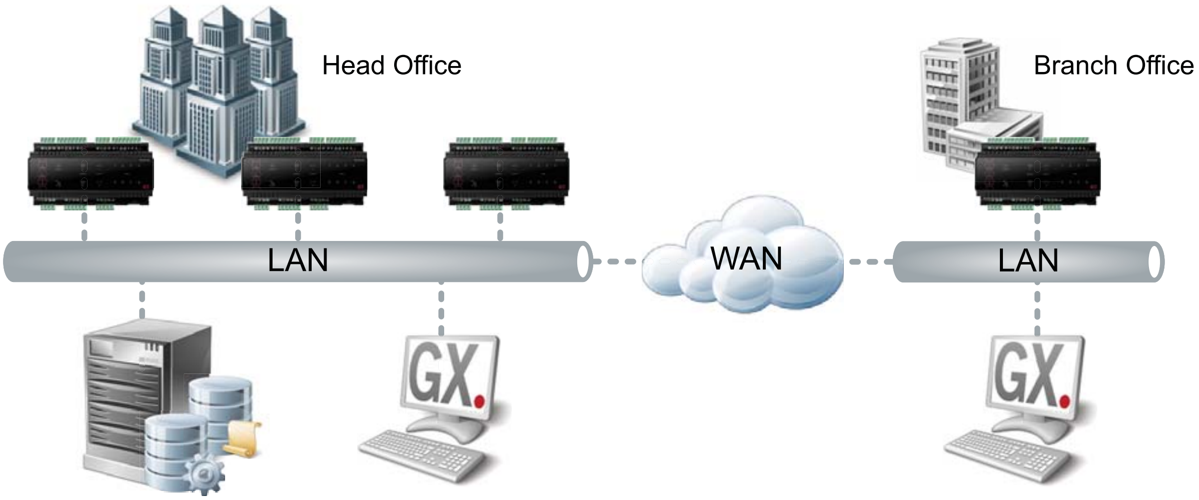
For larger sites with multiple controllers, a more powerful server is required. In this example, the server resides on a high spec PC, and the client software is installed on separate desktop PCs.



Always consult the system requirements in your installation guide prior to specifying your system.

Enterprise Level Solutions

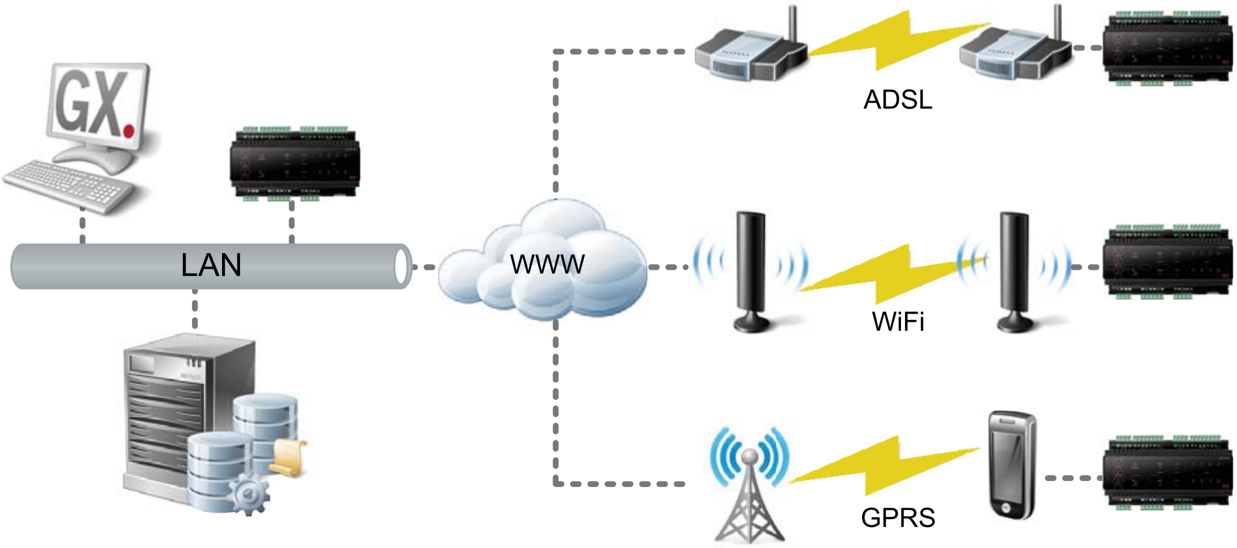
The Protege GX system is also designed to cater for the needs of corporate clients and scales well to enterprise class solutions.



This example shows a larger system running on existing corporate network infrastructure. The head office contains the central Server, a client PC and several controllers. There is also a branch office which has its own client PC and Controller.

Remote Environments

With IP technology constantly improving and internet coverage spreading further and further every day, thinking outside the box cannot only solve some tricky problems, but can open up a multitude of business opportunities.



Consider the example above showing Controllers connecting to a central server using an ADSL internet connection, WiFi access points and GPRS across a cellular network.

Remote Opportunities

Now imagine the possibilities of access control, intruder detection, and automation control in remote locations where these technologies are now available – buses, trains, boats and other vehicles, mobile plant, remote pumping stations, plant rooms or equipment sheds...

Wherever monitoring or control is required and a network connection is available, there is potential for a Protege GX system.

Advantages of a Server Based System

Protege GX was designed to be easy to operate, simple to integrate, and effortless to extend. It is a server based system, and as such, is not designed to be run on a technician's laptop. The following outlines the reasons why...

Simplicity

To keep the system simple and manageable for the end user, much of the hardware is hidden. When making configuration changes, you are making changes to the system rather than to a specific Controller. The system then manages which controllers need updating, and does this all behind the scenes.

Security

Any access control system contains valuable and often sensitive information.

This information belongs to the end user, not to the technician that happens to be maintaining or installing their system. It is dangerous, irresponsible, and in most cases completely unacceptable for a company's private data to be sitting on a technician's laptop, floating around in the back of a station wagon.

Synchronization

Setups that allow multiple copies of the system configuration are open to synchronization problems.

If one technician makes changes using his laptop on one day, then another technician attends on another day and forgets to upload all of the controllers first, changes the first technician made are overwritten.

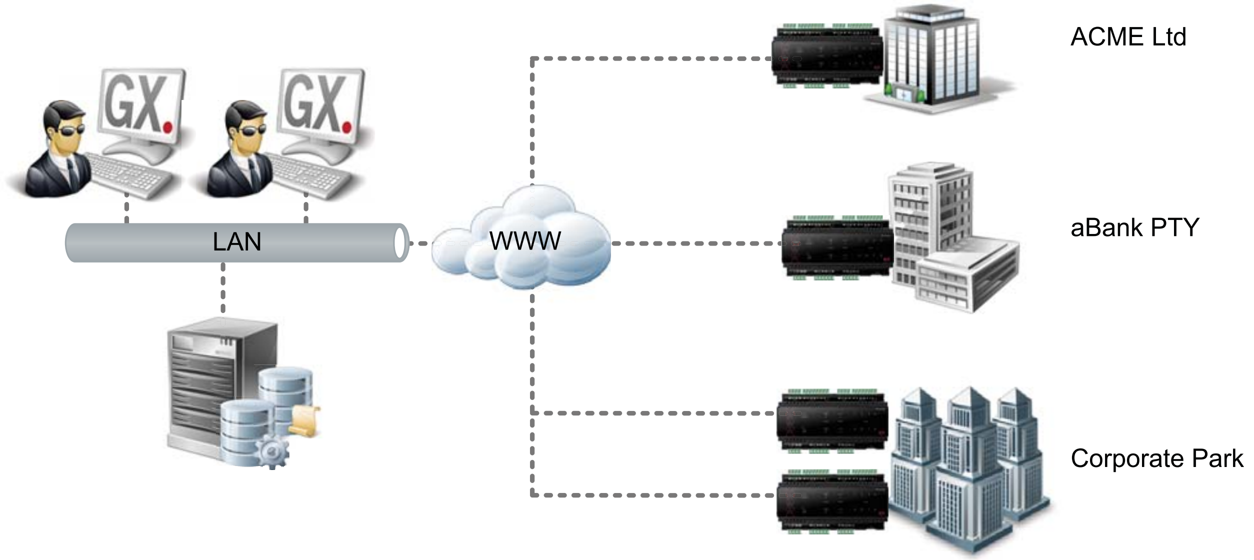
A server based system avoids this problem, as the changes are made immediately.

Protege GX and Small Sites

For some smaller sites, budget restricts the practicality of having a dedicated server on site. In this situation it is easy to jump to the conclusion that Protege GX is not suitable. This is not the case. It just needs a shift in thinking, and can actually present a new business opportunity.

Central Configuration

The majority of businesses these days have an internet connection. Where there is an internet connection, there is the ability to connect controllers to a server.



The example above shows a server with multiple client PCs at a central location controlling, configuring and monitoring multiple Controllers at individual client sites.

The Opportunities

Rather than having a laptop lying around in the back of your vehicle, install a server at your office and charge a monthly fee for configuring and monitoring the system.

Package this into a preventative maintenance package with a Software Maintenance Agreement and not only do you reduce the upfront capital expenditure, you turn a one off sale into a regular client.

Review Questions

Which database are events stored in?

- □ On the Controller only. The server interrogates the Controller for reports.
- □ The Protege GX database located on the Server.
- □ The Protege GX Events database located on the Server
- □ The reports database

What does the Protege GX database contain?

- □ Controller configuration only
- □ Global system configuration only
- □ The configuration for the entire system
- □ The configuration and events for the entire system

Can the GX Controller run in standalone mode?

- □ Yes, Protege GX is a controller based system. The Server is only used to program the Controller.
- □ Yes, Protege GX is a Server based system but Controllers will run stand-alone once configured.
- □ No, Protege GX is a Server based system and must have a network connection between the Controller and Server at all times.
- □ No, the Protege GX Controller stores its configuration database on the server.

The Protege GX Client Software...

- □ can be installed on only one PC if you only have a base licence
- □ is only installed on the Server if you only have a base licence
- □ can be installed on any number of workstations
- □ is never installed on the server

When making configuration changes...

- □ The GX Client makes changes to the Controller directly
- □ The GX Client makes changes to the Protege GX Database
- □ The GX Client makes changes to the Protege GX Database and Controller
- □ The GX Client is not used

What does the GX Client software communicate with?

- □ The server only
- □ The server for system configuration and reports, and the controller for status updates
- □ The controller for configuration and reports, and the server for status updates
- □ None of the above

Which of the following statements is correct?

- □ Controllers can communicate with the GX Server using the Internet
- □ Controllers must be on the same local area network as the GX Server
- □ Controllers must be on the same corporate network as the GX Server
- □ Controllers cannot communicate with the GX Server using the Internet

How does the Controller communicate with the server?

- □ Using the RS-485 module network
- □ Using TCP/IP on an Ethernet network
- □ Using the RS-232 serial interface
- □ Using Point to Point Protocol over Ethernet (PPPoE)

What type of site/system was Protege GX built for?

- □ High end residential sites
- □ Single controller commercial sites
- □ Enterprise scale systems
- □ All of the above

Which of the following is NOT a reason for making GX a server-based system?

- □ Storing system configuration on a server allows more data to be stored
- □ Configuration changes can be easily made to the system, then the system manages which Controllers need to be updated
- □ It helps to keep system information confidential
- □ It means there is a single point for all configuration changes

Complete this statement...

Where budget constraints on a small single Controller site mean an onsite server can't be justified...

- □ ...Protege GX is not a suitable solution
- □ ...the GX Controller should be programmed using a technicians laptop
- □ ...connect the Controller to a shared server using the Internet
- □ ...use any old existing PC as the server

Module 124:
Protege GX Hardware Overview

Protege GX is an enterprise level product with leading edge hardware and software to provide a solution for security, access control, and building automation. This module provides an overview of the hardware available and the features included.

In This Module

The Protege DIN Rail Range

The Protege DIN Rail range provides extensive hardware advancements and flexible access control, area control and alarm monitoring.

Designed with an industry standard DIN Rail mount enclosure, the modules allow for seamless integration into large scale installations alongside high end HVAC and electrical switchboard components.

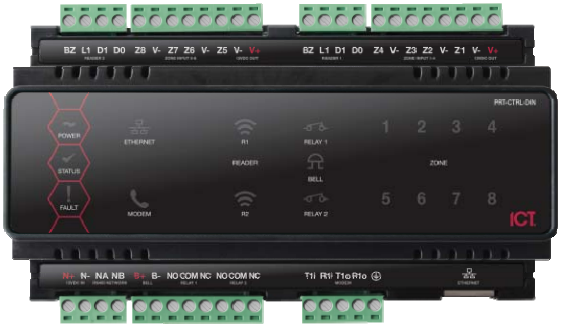
The DIN enclosures also provide more durability and protect the circuitry from damage. Exposed PCBs can be easily damaged physically or by electrostatic discharge.

Protege GX DIN Rail System Controller (PRT-CTRL-DIN)

ICT's latest central processing device, built to match the unparalleled scalability of the Protege GX Integrated System in a DIN Rail format. Responsible for the control of security, access control and automation in the Protege GX Integrated System.

Feature Highlights:

- 2 doors (4 readers) onboard
- Unlimited records
- 2 high current Form-A lock outputs
- 4 low current outputs for LED / buzzer control
- 8 zone inputs
- Expandable module network


BZ L1 D1 D0 Z8 V- Z7 Z6 V- Z5 V- V+
BZ L1 D1 D0 Z4 V- Z3 Z2 V- Z1 V- V+
PRT-CTRL-DIN
POWER
STATUS
FAULT
ETHERNET
MODEM
R1
READER
R2
RELAY 1
BELL
RELAY 2
1 2 3 4
ZONE
5 6 7 8
ICT
N+ N- NA NB B+ B- NO COM NC NO COM NC
T1i R1i T1o R1o

Capability

- 32 Bit advanced RISC processor
- 2 Gb total memory onboard

Communications

- 10/100 Ethernet port (Supports IPV6)
- IP Reporting built in
- Onboard alarm dialer (Contact ID or SIA)
- Expandable RS-485 Module Network

Door Access Control

- Two standard wiegand reader interface ports onboard
- Reader multiplexing allows 4 readers to be connected, for reader in and out on two doors
- Standalone – fully intelligent door control
- Control more doors by adding reader expanders (64+ doors supported)

8 Onboard Inputs

- Use for access control, detection devices such as PIRs, or a mixture of both
- Most common EOL combinations supported (no need to change resistors when upgrading)
- Monitor more inputs by adding input expanders (500+ inputs supported)

7 Onboard Outputs

- One 12VDC 1.1A Bell output
- Two high current (7A) relays for control of locks, lights, etc
- Four low current (50mA) outputs for LED / buzzer control
- Control more outputs by adding output expanders (500+ outputs supported)

PRT-CTRL-DIN: Technical Specifications

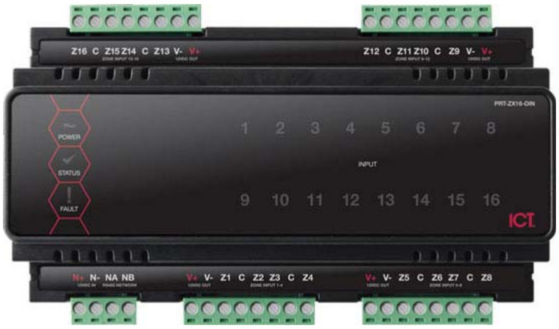
Technical Specifications	
Operating Voltage	12V DC +- 10%
Operating Current	120mA (Typical)
DC Output (Aux)	0.7A (Typical) Electronic Shutdown at 1.1A
Bell DC Output (Continuous)	8 Ohm 30W Siren or 1.1A (Typical)
Bell DC Output (Inrush)	1500mA
Communication	1 10/100Mbps Ethernet Communication Link 1 RS-485 Communication Interface Port
Readers (Standard)	2 Wiegand or clock data readers providing one Entry/Exit Door or two Entry/Exit only Doors
Readers (Multiplex)	4 Wiegand Readers (connected in Multiplex Reader mode) providing any combination of Entry or Exit for two Doors
Inputs (System Inputs)	8 High Security Monitored Inputs
Outputs	4 50mA (Max) Open Collector Output for reader LED and beeper or general functions
Relay Outputs	2 FORM C Relays - 7A max

Protege DIN Rail 16 Zone Input Expander (PRT-ZX16-DIN)

The Protege DIN Rail 16 Zone Input Expander extends the number of inputs on a system by 16, enabling monitoring of a wide range of EOL capable or open contact sensors for security and building automation purposes

Feature Highlights:

- 16 inputs, each can be assigned to up to 4 areas in the system and processed using different options or features
- Connect any combination of normally closed or normally open zones, configurable per zone input
- Utilizes analog to digital processing with 5x over sampling
- 4 input states to provide short, alarm, closed and tamper conditions
- High performance 32 Bit processor



PRT-ZX16-DIN: Technical Specifications

Technical Specifications	
Operating Current	80mA (Typical)
DC Input Voltage	12VDC (+/-10%)
Inputs	16 (10ms to 1hr Input Speed Programmable)
Comms	RS-485 Isolated Module Network

Protege DIN Rail 8 PGM Output Expander (PRT-PX8-DIN)

The Protege DIN Rail 8 PGM Output Expander extends the number of outputs on a system by 8, featuring high current Form-C relays providing flexible and structured control of lighting and automation systems.

Feature Highlights:

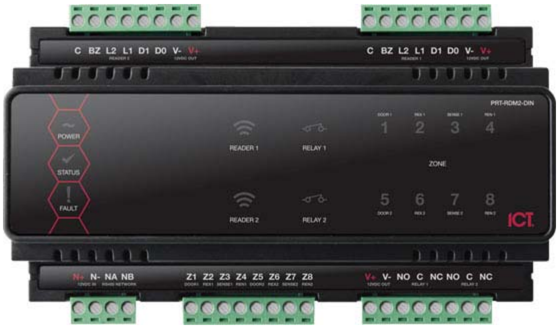
- 8 Form-C relay outputs capable of switching resistive loads up to 7 Amps
- Ideal for connection in an electrical switch room to control signage, lighting and building automation.
- LED indicators to show state of all onboard relays
- High performance 32 Bit processor

PRT-PX8-DIN: Technical Specifications

Technical Specifications	
Operating Current	80mA (Typical)
DC Input Voltage	12VDC (+/-10%)
Outputs	8 FORM C Relays, 7A 250V Max
Comms	RS-485 Isolated Module Network

Protege DIN Rail Mini 2 Reader Expander (PRT-RDM2-DIN)

The Protege DIN Rail Mini 2 Reader Expander extends the number of card reader inputs on a system by 2 (4 when using Multiple Reader mode), the number of inputs by 6, and the number of outputs by 8, providing flexible access control, area control and alarm monitoring.



Feature Highlights:

- Connect 2 readers using the independent reader inputs or connect 4 readers using the 2 reader operation to provide dual entry and exit door connection
- 6 zone inputs
- 2 FORM C lock outputs
- 6 open collector outputs (Reader Control outputs) with predefined configurations for instant connection (red LED, green LED and buzzer control)
- Support for intelligent reader tamper operation

Door Access Control

- Two standard wiegand reader interface ports onboard
- Reader multiplexing allows 4 readers to be connected, for reader in and out on two doors
- Support for intelligent reader tamper operation

8 Onboard Inputs

- Use for access control, detection devices such as PIRs, or a mixture of both
- Most common EOL combinations supported (no need to change resistors when upgrading)

8 Onboard Outputs

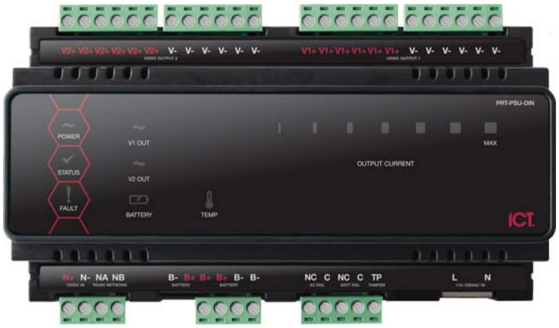
- Two high current (7A) relays for control of locks, lights, etc
- Six low current (50mA) outputs for LED / buzzer control

PRT-RDM2-DIN: Technical Specifications

Technical Specifications	
Operating Current	80mA (Typical)
DC Input Voltage	12VDC (+/-10%)
Doors	2 doors, up to 4 readers in multiplex mode
Inputs	6 4 state, EOL configurable, 1 module tamper
Outputs	2 Form C relays (7A max), 6 Open Collector (50mA)
Comms	RS-485 Isolated Module Network

Protege DIN Rail Intelligent Power Supply (PRT-PSU-DIN)

The Protege DIN Rail Intelligent Power Supply provides 12VDC power, ideal for running security, access control or automation devices, along with large numbers of Protege network powered modules within the same installation.



Feature Highlights:

- Mains input ideal for reducing complexity in set up and easy deployment
- 12VDC output voltage and up to 4.0 Amps continuous output current
- Battery backup connection for continued power delivery
- Intelligent charging algorithm monitors battery and AC supply
- Processor controlled battery level testing and indication
- Monitored signals for battery low/disconnect and AC failure

PRT-PSU-DIN: Technical Specifications

Technical Specifications	
Operating Current	110VAC 1500mA (Full Load) 220VAC 800mA (Full Load)
Mains Input	90 to 264VAC 47 to 63Hz
DC Output	4.0A Max (V1Out + V2Out Total)
PSU	Battery backup
Inputs	1 module tamper
Outputs	2 FORM B Relay Outputs, 50mA 12V Max
Comms	RS-485 Isolated Module Network

The Protege PCB Range

The Controller

...is the central processing unit responsible for the control of security, access control and automation in the Protege integrated system.

Ethernet 10 / 100 Connection

Controllers provide onboard Ethernet communication allowing direct connection from a local PC or interconnection to an existing LAN/WAN:

- Directly connect the Protege System Management Suite across a LAN or WAN interface for instant connection and upload download
- IP reporting functionality using the Protege IP Reporting protocol, Contact ID over IP, SIA over IP and full text reporting methods. The Protege IP Reporting protocol requires the Protege IP Reporting Bridge application operating on the remote machine or device with a suitable communications driver for the automation software being used.
- Full 10/100 compliant network interface allows the Protege Controller to connect to all networks at the maximum capable signaling rate. Indication of link status, signaling rate and data transmission/reception shown on LED status indicators.

Local Monitored Power Supply

The Controller operates from a 16VAC input, utilizing a low cost transformer and providing a fully monitored 12VDC power solution using:

- Deep discharge prevention of the battery with automatic electronic cut-off
- Manual or processor controlled battery charge selection of 350mA or 700mA
- Intelligent charging algorithm monitors battery and AC supply allowing optimum performance to be achieved using standard lead acid batteries
- Monitored signals for Battery Low/Disconnect and AC Failure using local trouble zones

Integrated Arming/Disarming

Controllers feature advanced integration of arming and disarming solutions for control of up to 250 alarm areas:

- Deny access to a user based on the status of the area and the ability for the user to control the area they are entering in turn reducing false alarms
- Implement bank vault areas to control and manage time delayed access and unlocking in banking facilities without the need for extra hardware control devices
- Prevent access to a keypad using a card and PIN function or allow card presentation to automatically login the user at the associated keypad
- Disarm an area associated with an elevator floor on access when using the destination reporting option or prevent the user from gaining access to the floor based on the area status associated with the floor
- Arm large numbers of areas using area groups

Integrated Access Control

The Controller provides a highly sophisticated access control solution with large user capacity and extensive features:

- Utilize primary and secondary access levels to manage users over simple scheduled periods and time zones
- Assign Door groups, Menu groups, Area groups, Floor groups and Elevator groups to an access level for flexible user management. Each group can optionally access a secondary group to provide multiple levels of user access.
- System wide global anti-pass back, the Protege Controller can maintain and control users area status throughout the entire system with hard and soft anti-pass back configuration options
- Multiple card presentation options allows the use of access control cards, tags or other credentials to arm and disarm areas associated with doors
- Count users entering an area and arm the area when the count reaches a terminal number or deny access to users based on a maximum user count

Automation Points

Automation points can be controlled from the Protege Alphanumeric LCD Keypad for the management of any controllable device such as lighting, air conditioning and signage. Accessible directly from the keypad, the automation points provide a user interface to the specific programmable outputs that a user can control.

Link automation points to programmable functions to provide sophisticated control logic at the selection of an automation point. Text names can be defined for the automation points, allowing a scrollable list of controllable items in the system such as Office A/C or Outside Lights.

Programmable Functions

Programmable Functions allow for the use of special applications that are configured in the Controller for Logic, Area, Door, and many other controllable devices:

- Process logic functions to allow complex equations to be evaluated using the special internal memory registers and PGM Output status
- Output of programmable functions can be directed to an action, memory region for storage and later use, or a programmable output
- Applications to reduce installation time for the control and automation of garden lighting, external lighting and electronic movement sensors with auto manual operation
- Control of Doors, Areas, Elevators and PGMs can be easily programmed and managed
- Starting and stopping of functions can be managed remotely including special run once options to allow manual control of a function that is controlled by an operator

Connectivity and System Expansion

Onboard local zone (input) and PGM (output) allows convenient cost effective expansion without the increased cost of modules for simple system functions:

- 16 onboard zone inputs can each be programmed to require EOL (End Of Line), Dual EOL or direct contact
- 2 Bell/Siren Outputs with fully monitored operation
- Use the Protege Alphanumeric LCD Keypad to expand the number of LCD keypads within an installation
- Zone expansion is provided on nearly all modules as part of the Protege Systems integrated structure and provides a dual function for many of the zone input configurations. Use the Protege 16 Zone Input Expander to expand the number of zone inputs on the Protege System.
- Output expansion is provided directly on the module network by the Protege 16 PGM Output Expander and incorporates 16 high current FORM C relays and fire control functions
- Expand the access control reader connections with the Protege Mini, Standard, Intelligent, or Ethernet Reader Expander. All provide 2 additional readers (or 4 Wiegand) and various options with local autonomous operation, power supply and Ethernet options.

Integration

Link the Protege System with intelligent locking solutions through Integrated Control Technologies comprehensive world class solution partners Hi-O Technology, Aperio and TZ.

Communication

RS-485 communication interface for module communication, onboard 2400bps modem with dual line input, and a 10/100 Ethernet communications port gives a complete solution:

- Network RS-485 port used for all network communication functions and interconnects to other modules with full galvanic isolation
- Onboard 2400bps modem interface to allow all popular alarm reporting formats and the ability for remote connection from the Protege System Management Suite
- 10/100Mbps Ethernet interface for communication with the Protege System Management Suite and other applications and functions

Multifunction Reporting Services

Utilizing the latest functionality in communication services the Controller incorporates a host of communication options:

- Monitor telephone line inputs using the monitor phone service and answer incoming calls on local modem interface using answer machine override and high security remote call back options
- Report alarms using Contact ID, SIA Level 2
- Communicate with terminal programs using the Telnet Terminal option and output the data in ASCII, HEX with custom format options and acknowledgement settings to allow connection of third party applications directly to the Protege Controller
- Send IP based reporting protocols using the onboard Ethernet communication interface and Protege IP Reporting ArmorIP formats

Upgradable Firmware

Utilizing the latest flash technology and high performance communication interface the firmware can be updated using industry standard applications.

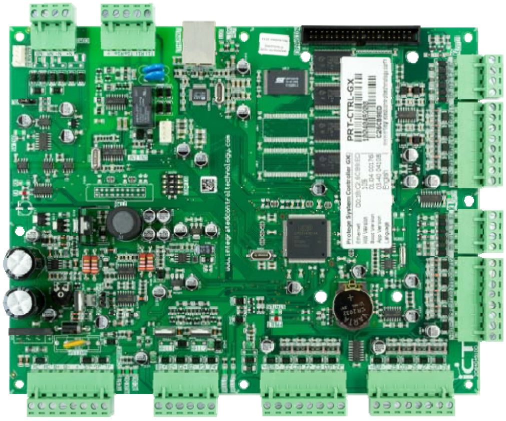
Electronic Bell/Siren Outputs

High current electronic monitored Bell/Siren control outputs:

- Indication of Bell/Siren outputs activation using LED. Bell/Siren failure monitoring or lock disconnected (tamper) displayed as indicator and reported using trouble zone
- Automatic shutdown on bell over current when activated or shorted. Automatic restore on next deactivation/activation cycle. Shutdown reported using trouble zone.

Protege GX Integrated System Controller (PRT-CTRL-GX)

The Protege Integrated System Controller is the central processing unit responsible for the control of security, access control and automation in the Protege integrated system, an advanced technology security product providing seamless and powerful integration of access, security and building automation.



Feature Highlights:

- Control two doors onboard
- Internal industry standard 10/100 Ethernet
- Communicate with Ethernet modules that are interconnected using a LAN or corporate network
- In-built offsite dual line communications dialer (ContactID, SIA)
- 32 Bit advanced RISC processor with 2MB RAM and 4MB flash
- 16 high security monitored zone inputs
- 2 high current outputs
- Firmware upgradable using standard IT technology
- Enhanced technology power supply with battery charging and monitoring
- Encrypted module network using RS-485 communication

PRT-CTRL-GX: System Capacities

System Capacities	Fixed Profile
Users	5000
Events	2000
Schedules	128
Doors	64
Inputs	912
Outputs	676
Zone (Input) Expanders	32
PGM (Output) Expanders	8
Analog Expanders	8
Keypad Modules	32
Reader Expanders	32

Maximum Controllers per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

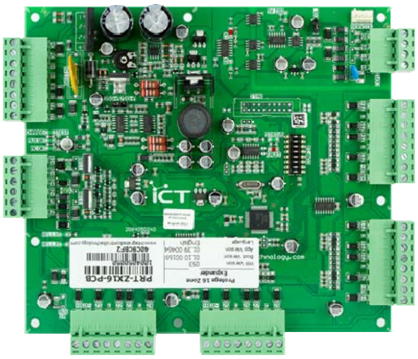
Input (Zone) Expanders

Protege 16 Zone Input Expander (PRT-ZX16)

The Protege 16 Zone Input Expander provides the interface of up to 16 zone inputs, 2 bell/siren device outputs and 2 programmable outputs to the Protege system

Technical Specifications

- **Operating Current:** 97mA (143mA max)
- **AC Input:** 16VAC, 40VA
- **DC Output (AUX):** 1.2A Fused & Monitored
- **PSU:** Local monitored PSU with battery backup
- **Inputs:** 16 4 state, EOL configurable.   1 module tamper
- **Outputs:** 2 High current (1.0A), 2 Open Collector (50mA)
- **Comms:** 1x Galvanic isolated RS-485 port



Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

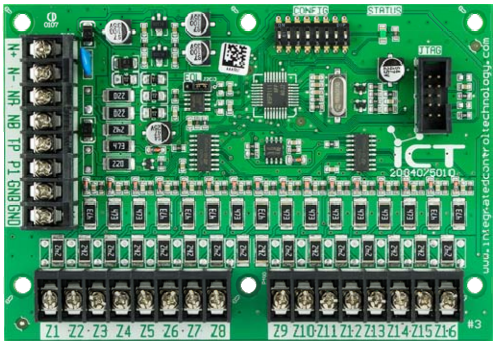
Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

Protege Standard 16 Zone Input Expander (PRT-ZXS16)

The Protege Standard 16 Zone Input Expander provides the interface of up to 16 zone inputs and 1 programmable output to the Protege system.

Technical Specifications

- **Operating Current:** 47mA
- **Inputs:** 16 4 state, EOL configurable. 1 module tamper
- **Outputs:** 1 Open Collector (50mA)
- **Comms:** 1 non isolated RS-485 port


CONFIG
STATUS
JTAG
N+ N- NA NB TP P1 GND GND
iCT
www.integratedcontroltechnology.com
Z1 Z2 Z3 Z4 Z5 Z6 Z7 Z8
Z9 Z10 Z11 Z12 Z13 Z14 Z15 Z16

Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
1	1	4	8

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

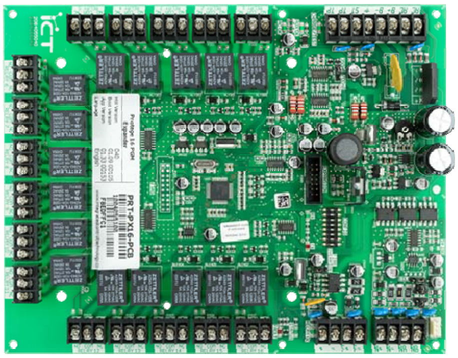
Zone Input Expander Comparison

Feature	PRT-ZXS16	PRT-ZX16
Onboard PSU	No	Yes
Zone Inputs	16	16
PGM Outputs (Total)	1	4
High Current Bell PGM Outputs	None	2
Low Current Open Collector	1	2
Isolated Module Network	No	Yes
Module Powered Device	Yes	No
Multiple AUX Supply Points	No	Yes

Output (PGM) Expanders

Protege 16 PGM Output Expander (PRT-PX16)

The Protege 16 PGM Output Expander provides the control of 16 high current FORM C relay outputs or 16 elevator floors (connected with a Protege Intelligent 2 Reader Expander) from the Protege system.



Technical Specifications:

- Operating Current: 119mA (1145mA max all relays activated)
- AC Input: 16VAC, 40VA
- DC Output (AUX): 150mA Fused and Monitored
- PSU: Local monitored PSU with battery backup
- Inputs: 1 x Fire Control (12-24VDC 6.5mA). 1 x module tamper
- Outputs: 16 x Form C Relays (5A max) with LED status indication
- Comms: 1 x Galvanic isolated RS-485 port
- Expansion: Optional 16 galvanic isolated inputs for elevator destination reporting (PRT-PX16-DRI)

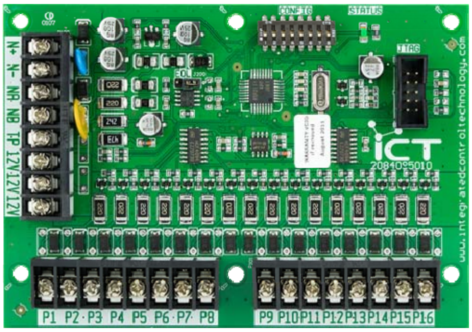
Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

Protege Standard 16 PGM Output Expander (PRT-PXS16)

The Protege Standard 16 PGM Output Expander provides the control of 16 low current open collector outputs from the Protege system.


N+ N- NA NB TP 12V 12V 12V
CONFIG
STATUS
JTAG
iCT
www.integratedcontroltechnology.com
P1 P2 P3 P4 P5 P6 P7 P8
P9 P10 P11 P12 P13 P14 P15 P16

Technical Specifications:

- **Operating Current:** 129mA (148mA max all relays activated)
- **Inputs:** 1x module tamper
- **Outputs:** 16 x Open Collector (50mA)
- **Comms:** 1 x non- isolated RS-485 port

Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
1	1	4	8

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

Output Expander Comparison

Feature	PRT-PXS16	PRT-PX16
Onboard PSU	No	Yes
Zone Inputs	None	None
PGM Outputs (Total)	16	16
Form C Relay	None	16
Low Current Open Collector	16	None
Isolated Module Network	No	Yes
Module Powered Device	Yes	No
Elevator Floor Controller	No	Yes
Fire Control Unit	No	Yes

Reader Expanders

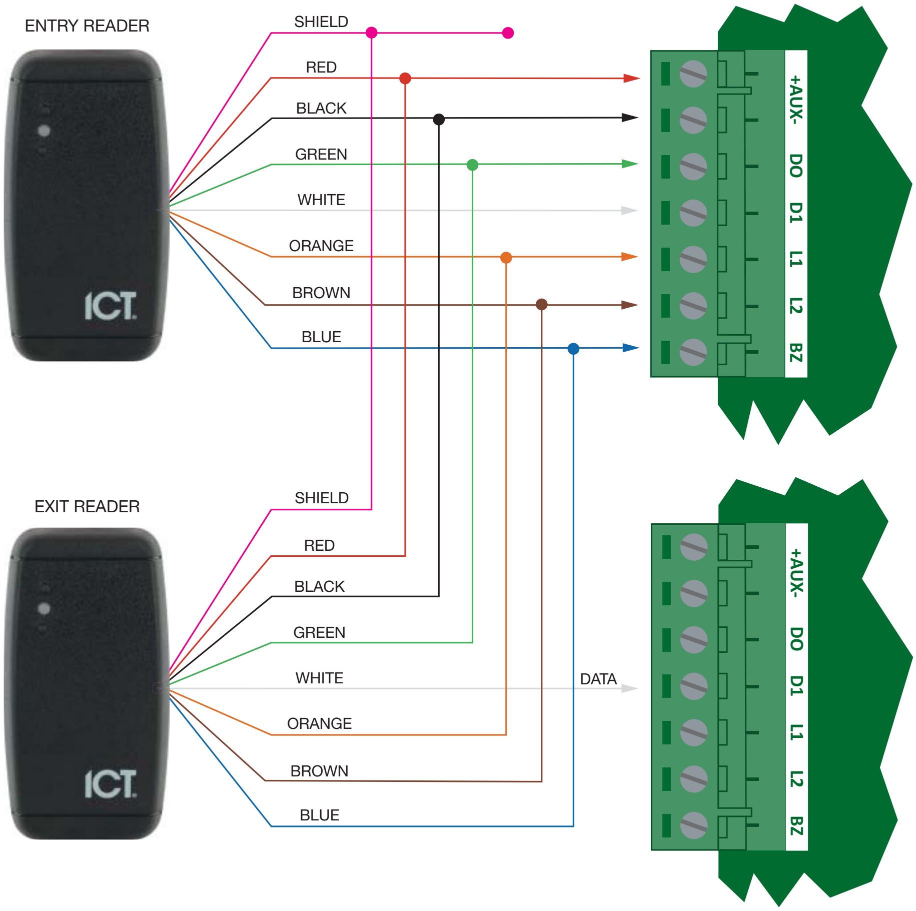
Feature Highlights

- Connect 2 readers using the independent reader inputs or use the 2 reader operation to connect 4 readers providing dual entry and exit door connection.
- Provision to control up to 3 Outputs per reader input with predefined configurations for instant connection (red LED, green LED and buzzer control).
- Support for intelligent reader tamper operation the system will monitor the reader for reader keep-alive transmissions using the programmed protocol.
- Data received LED indicates a valid decode of the format on the Reader.
- Individually fused and monitored reader power supply protected with auto reset electronic polythermal fuse and monitored reader supply voltage.
- Power Output indicator shows power is available on the reader voltage Outputs.
- Over 45 formats predefined for simple configuration, additional formats added using the format builder or implemented directly using the firmware update function.

Multiplex Reader Mode

Pushing the boundaries of functionality, ICT have taken another step in providing the capability to connect up to 4 readers on to ANY of the reader expanders with the multiplex reader mode:

- Allows the addition of an EXIT reader on to any existing entry with REX egress configuration
- Identifies the entity with the associated EXIT and ENTRY events
- No limitations are made on the operation allowing user counting, car park counting, loiter operation, credential anti-pass back and area control to take place on the readers used in multiplex mode
- Increased saving to customer while giving retrofit and installation flexibility



This functionality is also available on the SE controller.

Arming/Disarming

The Reader Expander allows a user to arm and disarm an area from a reader input when associated with a door:

- Deny access to a user based on the status of the area reducing false alarms
- Dual presentation of the card can arm an area associated with the entry or exit direction of the door being accessed
- Fail to arm programmable output can be programmed to provide feedback in the event areas fail to arm when using card reading functions
- Prevent access to a keypad using a card and PIN function or allow card presentation to automatically login the user at the associated keypad
- Disarm an area associated with an elevator floor on access when using the Protege 16 Input Destination Reporting Interface in elevator mode

Connectivity and System Expansion

Expanding the Protege System with local zone (input) and PGM (Output) from Protege Reader Expanders allows convenient cost effective expansion and added benefit of dual functionality on door monitoring zones:

- 6 or 8 zones (depending on the module) can be used to perform any system alarm and automation functions with a dedicated enclosure tamper switch.
- Configurable EOL resistor combinations
- All zones are assigned functions that are processed by the Reader Expander for door control. Each function can be enabled or disabled individually, as required.

Network RS-485 port used for all network communication functions and interconnects to other modules.

Upgradable Firmware

Utilizing the latest flash technology and high performance communication interface the firmware can be updated using industry standard applications.

Local Monitored Power Supply (RDS2, RDI2, RDE2)

The RDS2, RDI2, and RDE2, operate from a 16VAC input, utilizing a low cost transformer and providing a fully monitored 12VDC power solution using:

- Deep discharge prevention of the battery with automatic electronic cut-off
- Manual or processor controlled battery charge selection of 350mA or 700mA
- Intelligent charging algorithm monitors battery and AC supply allowing optimum performance to be achieved using standard lead acid batteries
- Monitored signals for Battery Low/Disconnect and AC Failure using local trouble zones

Electronic Lock Outputs (RDS2, RDI2, RDE2)

High current electronic monitored electric lock control Outputs:

- Indication of lock output activation using LED
- Lock failure monitoring or lock disconnected (tamper) displayed as indicator and reported using trouble zone
- Automatic shutdown on lock over current when activated or shorted with automatic restore on next deactivation/activation cycle. Shutdown reported using trouble zone.
- Drive electric strikes directly from the lock outputs

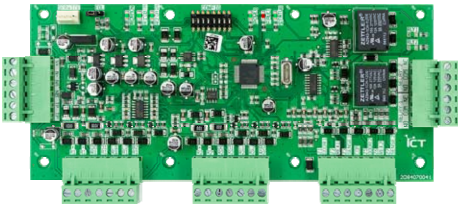
Elevator Control (RDI2, RDE2)

The RDI2 and RDE2 allow the control of two independent elevator cars capable of servicing 128 openings (floors):

- Utilize button feedback for floor selection monitoring and single badge, single floor control prevents user tailgating with full floor selection audit.
- Deny access to a user based on the status of the area on a specific floor that they are attempting to access (button feedback required).
- Floor can use the Late Open option forcing the floor to remain locked on a schedule until valid access to the floor is granted.
- Interface to the Protege 16 PGM Output Expander using the slave RS-485 communication port for intelligent elevator control (controls 16 floors per Protege 16 PGM Output Expander per elevator car).
- Optional high level RS-485 communication to elevator control system (requires protocol documentation to be provided).

Protege Mini 2 Reader Expander (PRT-RDM2)

The RDM2 is a small and cost effective module for controlling up to 2 doors. Mounted in a medium cabinet, this module has a very small footprint, or mount up to 8 modules in a jumbo cabinet to control up to 16 doors.



Technical Specifications:

- Operating Current: 83mA (109mA max)
- Doors: 2 doors, up to 4 readers in multiplex mode
- Inputs: 6 4 state, EOL configurable. 1 module tamper
- Outputs: 2 Form C relays (5A max), 6 Open Collector (50mA)
- Offline Operation: Stores first 10 users + 50 cached users. No offline schedules. No offline event storage
- Comms: 1 non-isolated RS-485 port

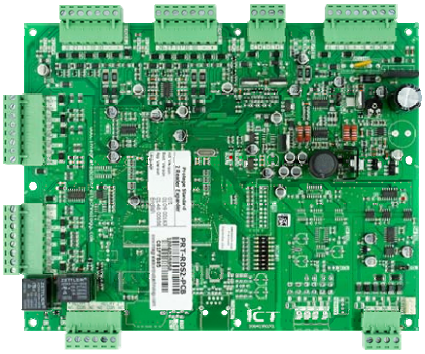
The RDM2 (and any readers connected to it) draw their power from the RS-485 Module Network.

Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
1	1	4	8

Protege Standard 2 Reader Expander (PRT-RDS2)

The RDS2 has all the same functionality as the RDM2, but including a local power supply and battery backup, 2 additional zone inputs and 2 fixed voltage, high current monitored lock outputs. Power locks directly from the module, or use the onboard Form C relays to switch an external power supply.



Technical Specifications:

- **Operating Current:** 119mA (207mA max all relays activated)
- **AC Input:** 16VAC, 40VA
- **DC Output (Aux):** 1.2A Fused & Monitored
- **PSU:** Local monitored PSU with battery backup
- **Doors:** 2 doors, up to 4 readers in multiplex mode
- **Inputs:** 8 4 state, EOL configurable. 1 module tamper
- **Outputs:** 2 12VDC monitored lock outputs (1A continuous, 1.2A max) or 2 Form C relays outputs for lock control (no lock monitoring), 6 open collector outputs (50mA)
- **Offline Operation:** Stores first 10 users + 50 cached users. No offline schedules. No offline event storage
- **Comms:** 1 Galvanic isolated RS-485 port

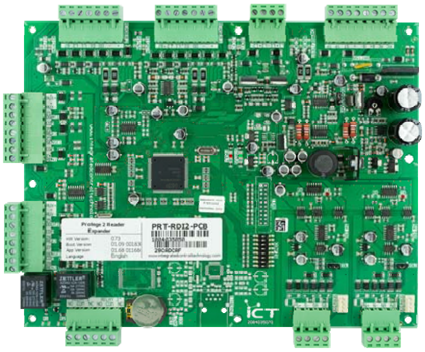
Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

Protege Intelligent 2 Reader Expander (PRT-RDI2)

In addition to the features of the RDS2, the RDI2 also has the ability to run standalone in offline mode with 2000 users, 2000 events, and schedules stored locally, enabling the RDI2 to continue to operate seamlessly should there be a loss of RS-485 communications.



Technical Specifications:

- Operating Current: 119mA (207mA max all relays activated)
- AC Input: 16VAC, 40VA
- DC Output (Aux): 1.2A Fused & Monitored
- PSU: Local monitored PSU with battery backup
- Doors: 2 doors, up to 4 readers in multiplex mode
- Inputs: 8 4 state, EOL configurable.   1 module tamper
- Outputs: 2 12VDC monitored lock outputs (1A continuous, 1.2A max) or 2x Form C relays outputs for lock control (no lock monitoring), 6 open collector outputs (50mA)
- Offline Operation: 2000 users, schedules, 2000 events
- Comms: 2 Galvanic isolated RS-485 ports

The RDI2 has a second RS-485 port onboard which can be used as a Module Network repeater to provide extended distance, two more spurs, or allow repowering of the network. It can also be used to interface with a number of 3rd party devices, including high and low level elevator control and locking systems such as Aperio.

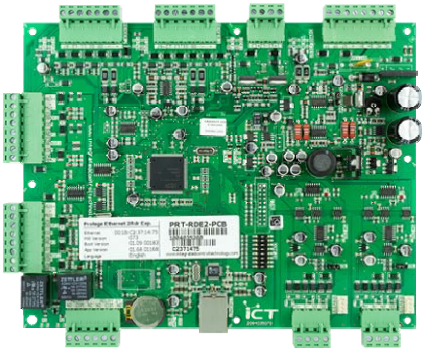
Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

Protege Ethernet 2 Reader Expander (PRT-RDE2)

The RDE2 has all of the intelligence of the RDI2, but with an onboard Ethernet interface. It can be plugged virtually anywhere on the network allowing the use of existing network infrastructure. The RS-485 ports can then be used to extend the network in four directions for elevator control or 3rd party system integrations.



Technical Specifications:

- **Operating Current:** 119mA (207mA max all relays activated)
- **AC Input:** 16VAC, 40VA
- **DC Output (Aux):** 1.2A Fused & Monitored
- **PSU:** Local monitored PSU with battery backup
- **Doors:** 2 doors, up to 4 readers in multiplex mode
- **Inputs:** 8 4 state, EOL configurable. 1 module tamper
- **Outputs:** 2 12VDC monitored lock outputs (1A continuous, 1.2A max) or 2x Form C relays outputs for lock control (no lock monitoring), 6 open collector outputs (50mA)
- **Offline Operation:** 2000 users, schedules, 2000 events
- **Comms:** 2 Galvanic isolated RS-485 ports, 1 10/100 Ethernet port

Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
-	1	2	4

Requires 1 16VAC, 40VA 16 Transformer (TFR-40-16)

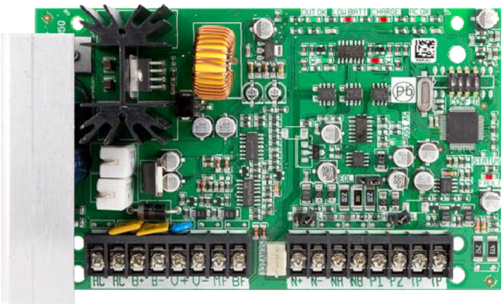
Reader Expander Comparison

Feature	PRT-RDM2	PRT-RDS2	PRT-RDI2	PRT-RDE2
Power Supply	12VDC	16VAC	16VAC	16VAC
Battery Backup	-	Yes	Yes	Yes
AUX PSU	-	1A	1A	1A
Lock Outputs	2 Relay	2 Electronic	2 Electronic	2 Electronic
Lock Monitoring	-	Yes	Yes	Yes
Offline Users	10	10	2000	2000
Reader Ports	2	2	2	2
Multiplexed (4) Readers	Yes	Yes	Yes	Yes
Isolated RS485 Ports	-	1	2	2
Non-Isolated RS485 Ports	1	-	-	-
Ethernet	-	-	-	Yes

Power Supply

Protege Intelligent 5 Amp Power Supply (PRT-PSU-5I)

The Protege Intelligent 5 Amp Power Supply provides 12VDC power ideal for running security, access control or automation devices along with large numbers of Protege network powered modules in the same installation.



Technical Specifications:

- **Operating Current:** 100mA (typical, no load)
- **AC Input:** 16VAC, 100VA
- **DC Output:** 5A (max)
- **PSU:** Battery backup
- **Inputs:** 1 module tamper
- **Outputs:** 1 mains fail open collector output, 1 battery low open collector output, 2 programmable open collector outputs (50mA)
- **Comms:** 1 Galvanic isolated RS-485 port

Reliable Power

The Protege Intelligent 5 Amp Power Supply is capable of supplying power to a large number of smaller devices or multiple high current devices up to a maximum of 5 Amps.

A continuous source of power is maintained with the inclusion of intelligent battery backup charging, optimal level maintenance and seamless switch on AC failure. The battery backup and AC status are constantly monitored, and failure conditions are communicated to the Protege System and simultaneously output to open collector drivers suited to connection to third party warning systems.

Intelligent Power Monitoring

The Protege Intelligent 5 Amp Power Supply is able to relay information about critical system voltages and currents to the Protege Integrated System Controller by registering as an analog expander module on the Protege network.

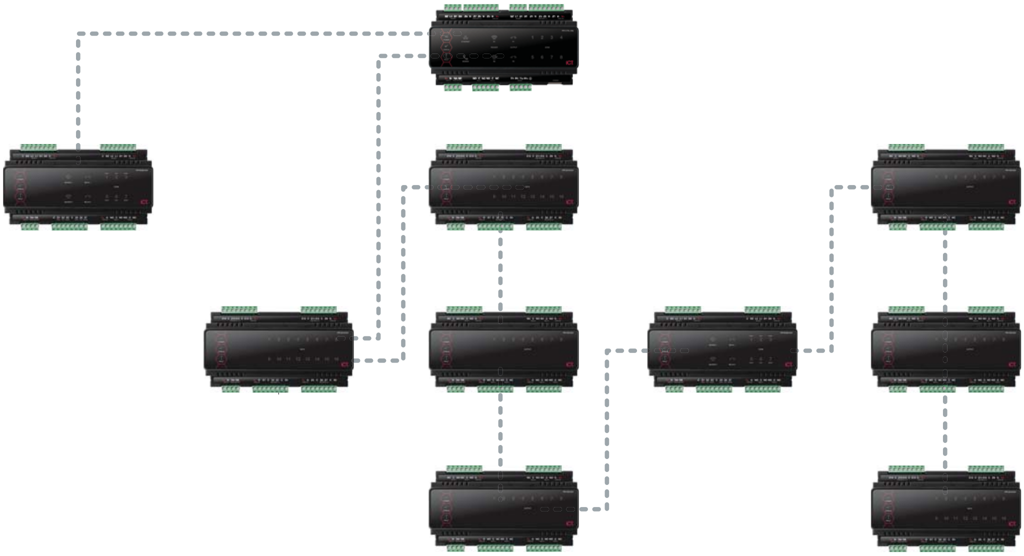
The Protege Controller can then store these values in system registers that can be viewed live from the Protege software. This allows live viewing of the system voltages and currents along with logging for review at any time.

Maximum Number per Enclosure

Medium	Large	Fatboy	Jumbo
1	1	4	8

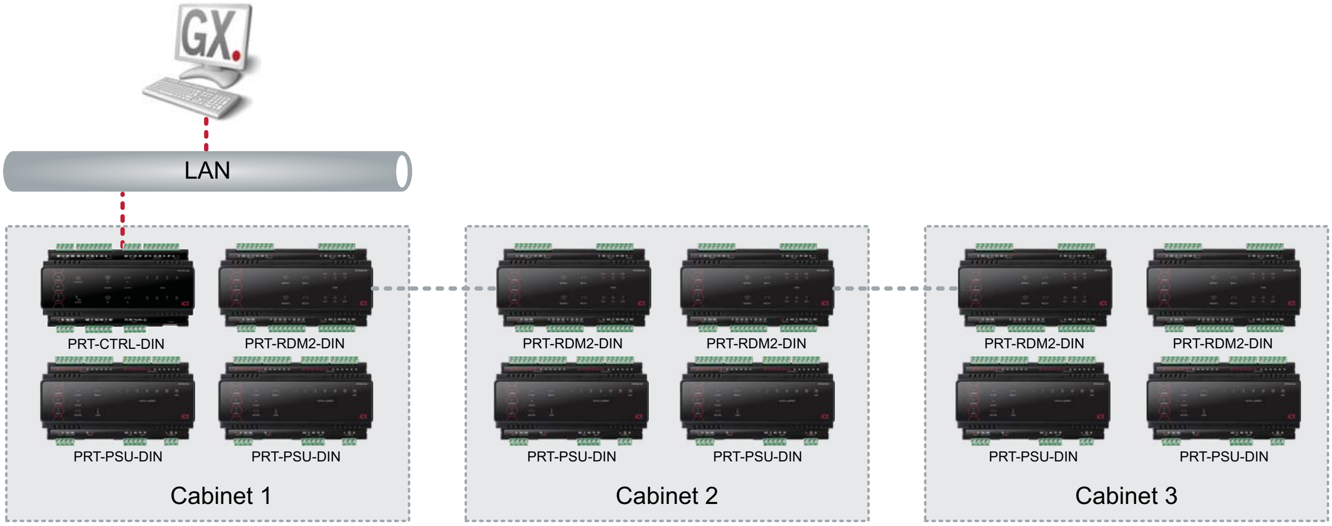
The Protege GX Module Network

The Protege system utilizes a RS-485 four-wire powered module network in a multi-drop daisy-chain configuration

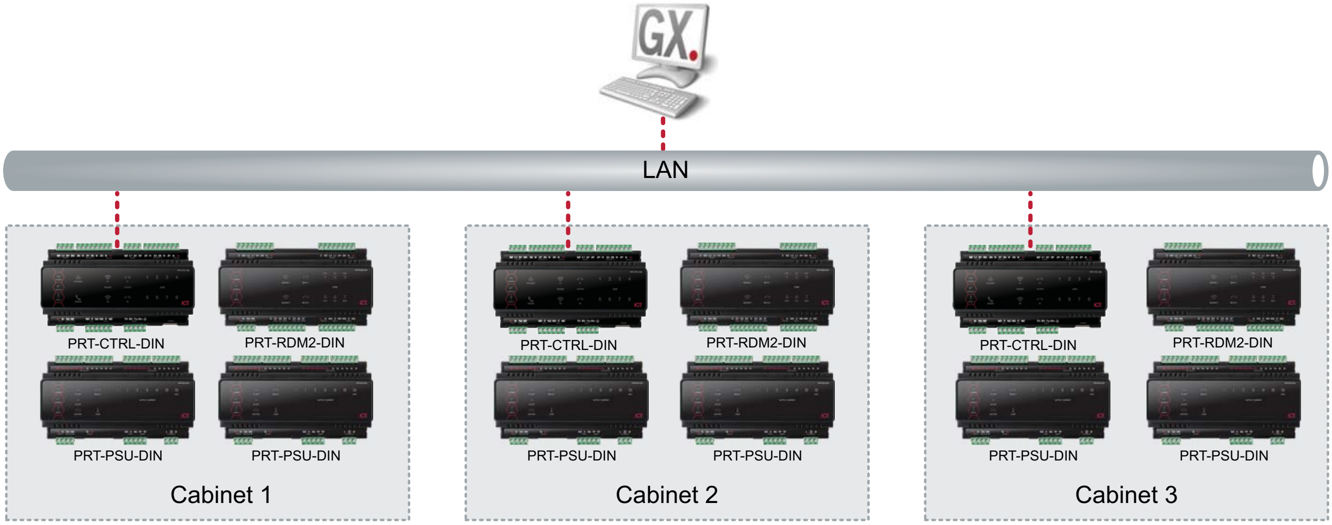


System Architecture

Systems can be made up of a single Controller with multiple expanders connected by the RS-485 Module Network

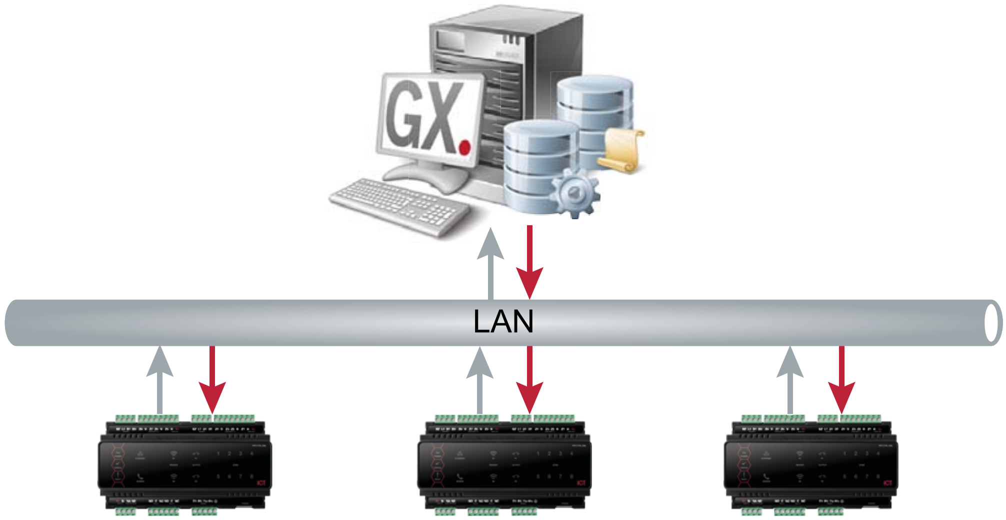


Systems can also be made up of multiple Controllers with multiple expanders, with the Controllers connecting to the Server via Ethernet (Ethernet standards apply)

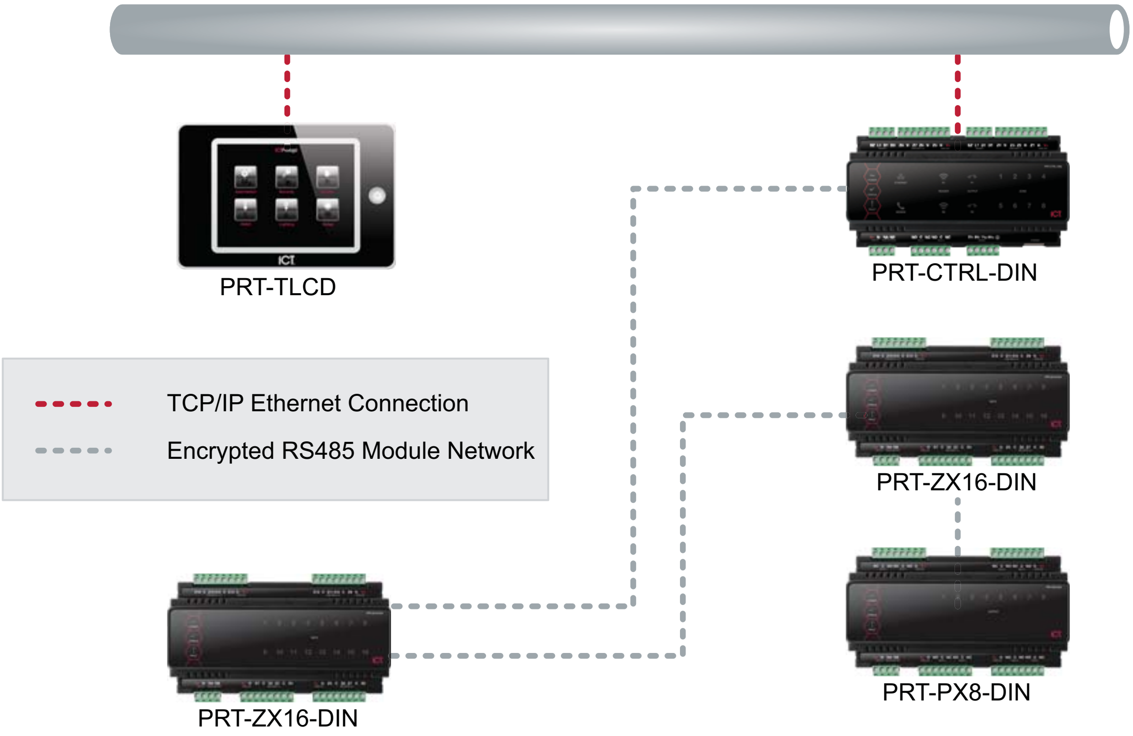


Communications

System controllers communicate with the Protege Server using **TCP/IP**

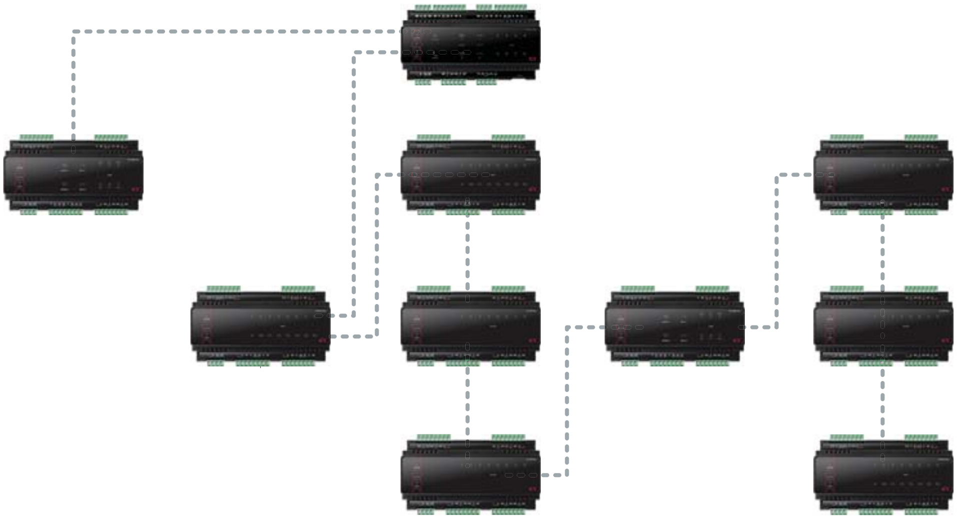


Protege modules communicate to the controller using an **encrypted high speed module network** or via **TCP/IP**

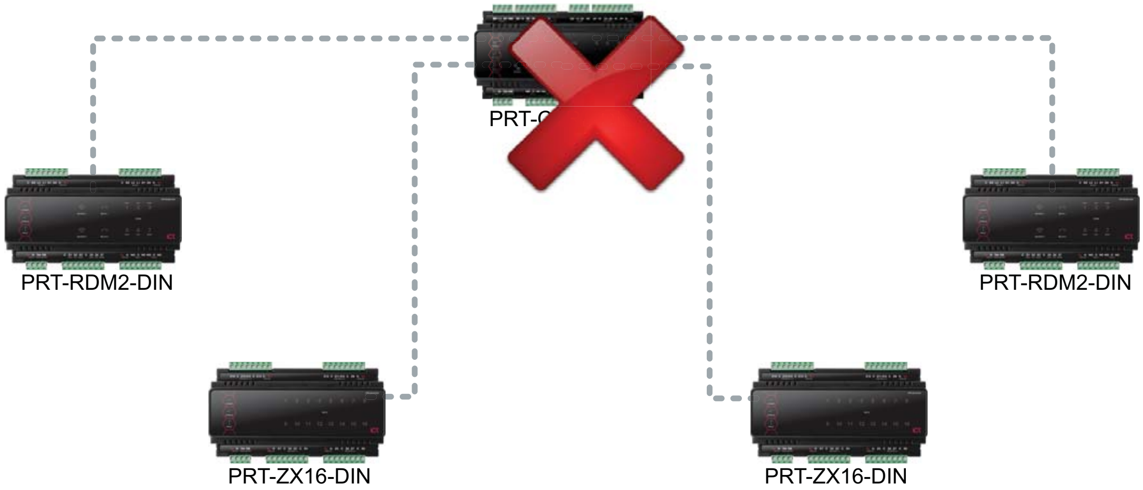


Module Wiring

The RS-485 module network must be wired in a daisy chain configuration



Star or Spur wiring is not an acceptable method for new installations



Cabling

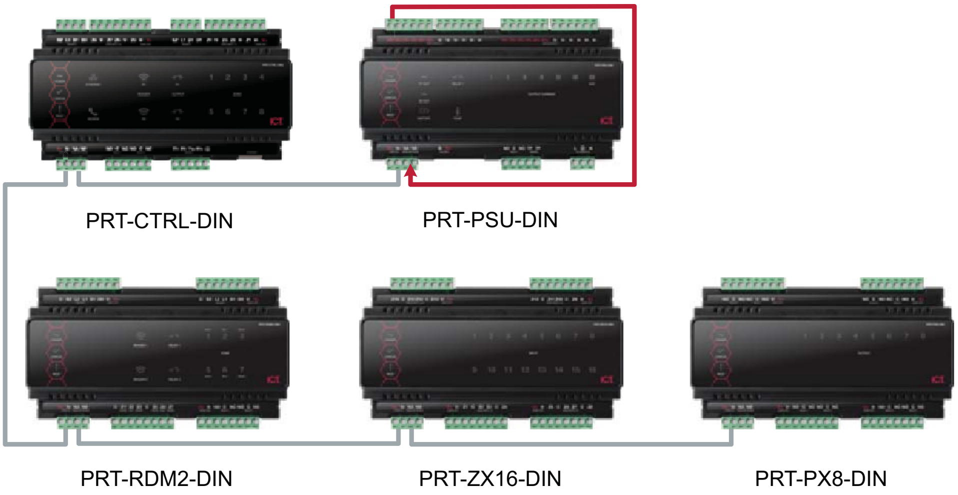
The RS-485 module network must be wired in a daisy chain configuration.

- Belden 9842 RS-485 cable is recommended
- Total length of the module network should not exceed 900 metres (2952 feet).
- Cat5E cable can be used, but is limited to 100 metres (328 feet)

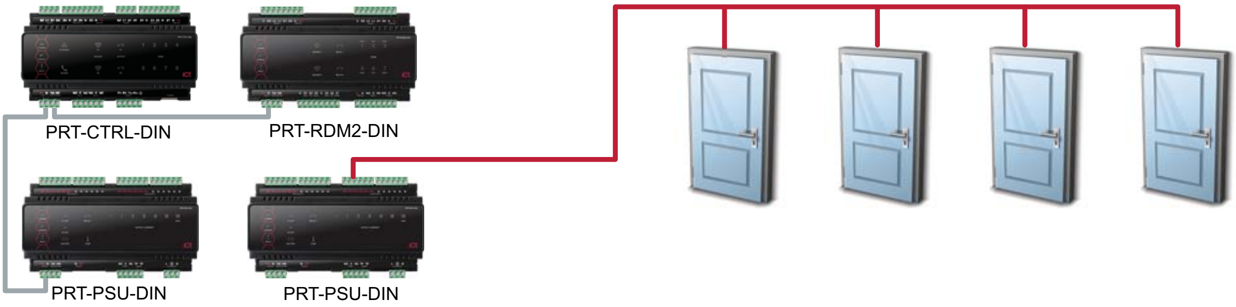
Warning: Unused wires in the cable must not be used to carry power to other devices.

Module Network Power

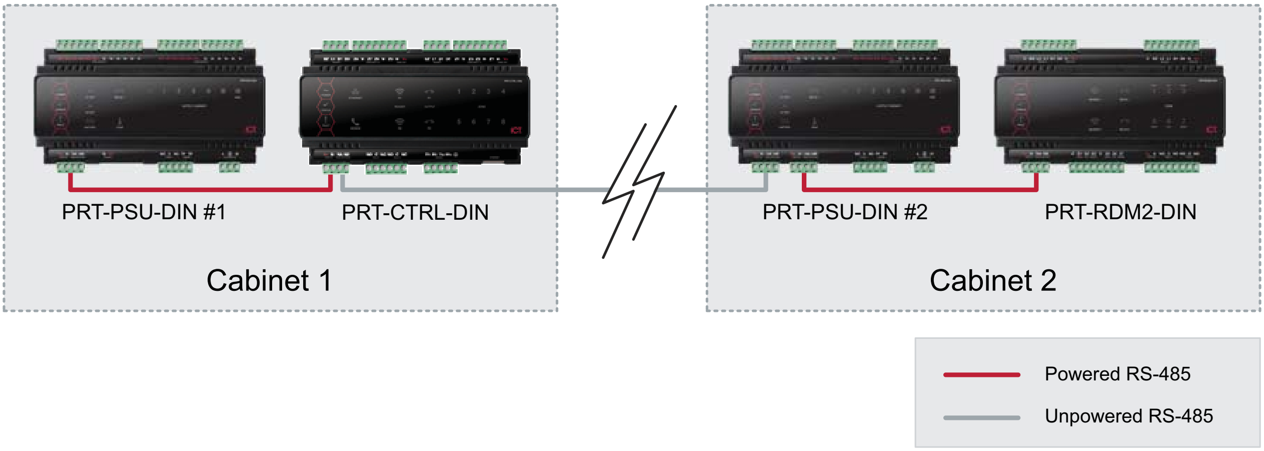
The DIN Rail range is supplied by a 12V DC power supply connected to the Module Network. We recommend using an ICT PRT-PSU-DIN however any clean 12V DC supply is suitable. In a small installation this can be powered by a single PSU, as long as the maximum load of the power supply is not exceeded



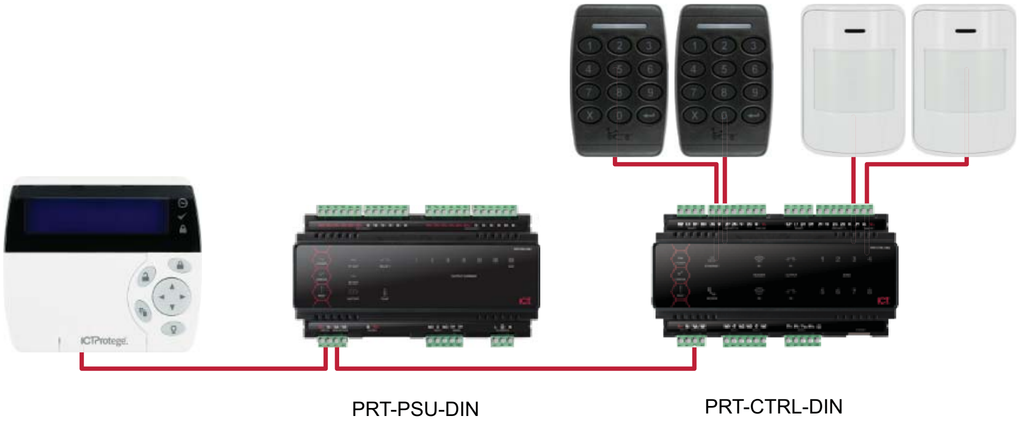
It is recommended that the power supply used to power the module network is dedicated to this task, and is not used to power other devices, especially electrically noisy devices such as locks. Where possible, use a separate supply for your locks.



In larger installations, the Module Network power supply may need to be split to allow for load sharing between several supplies. This is done by removing the N+ connection from between split sections.



All ancillary devices connected to a module network powered device, such as keypads, readers or PIRs also draw their power from the module network. You must include all connected devices when considering power supply loading calculations.



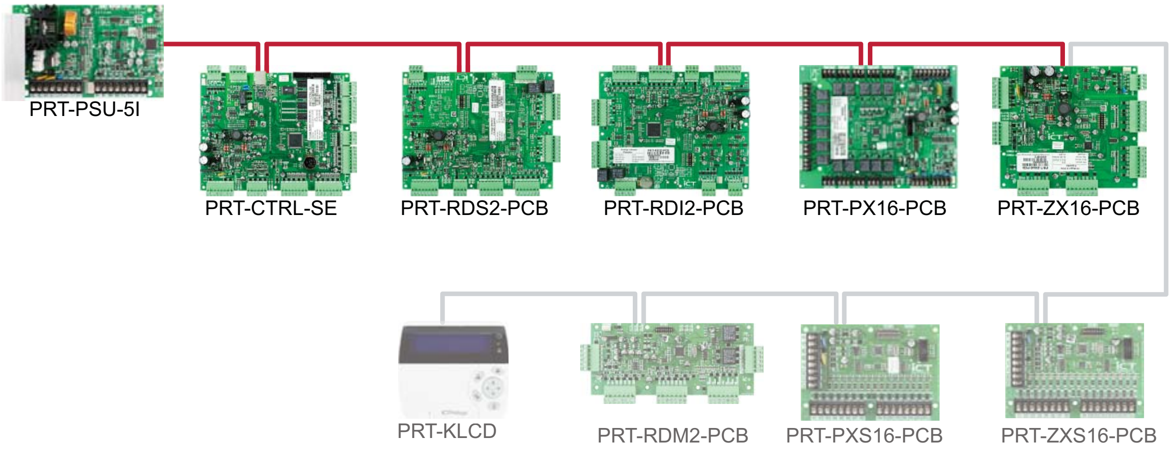
Module Network Isolated Devices

The Protege suite of hardware is made up of a number of devices where the Module Network is optically isolated from the rest of the device. This provides additional system integrity and allows modules to be powered by other supplies.

The following modules typically have an onboard power supply, requiring a 16VAC feed:

- PRT-CTRL Protege System Controller
- PRT-RDS2 Protege Standard Reader Expander
- PRT-RDI2 Protege Intelligent Reader Expander
- PRT-RDE2 Protege Intelligent Ethernet Reader Expander
- PRT-PX16 Protege 16 PGM Output Expander
- PRT-ZX16 Protege 16 Zone Input Expander
- PRT-ADC4 / PRT-DAC4 Protege Analog Expanders

Even if the module has an onboard power supply, the module network must still be powered from one location.



This is usually from a dedicated power supply, but in small installations can be powered by a module with an onboard supply, such as the Controller.

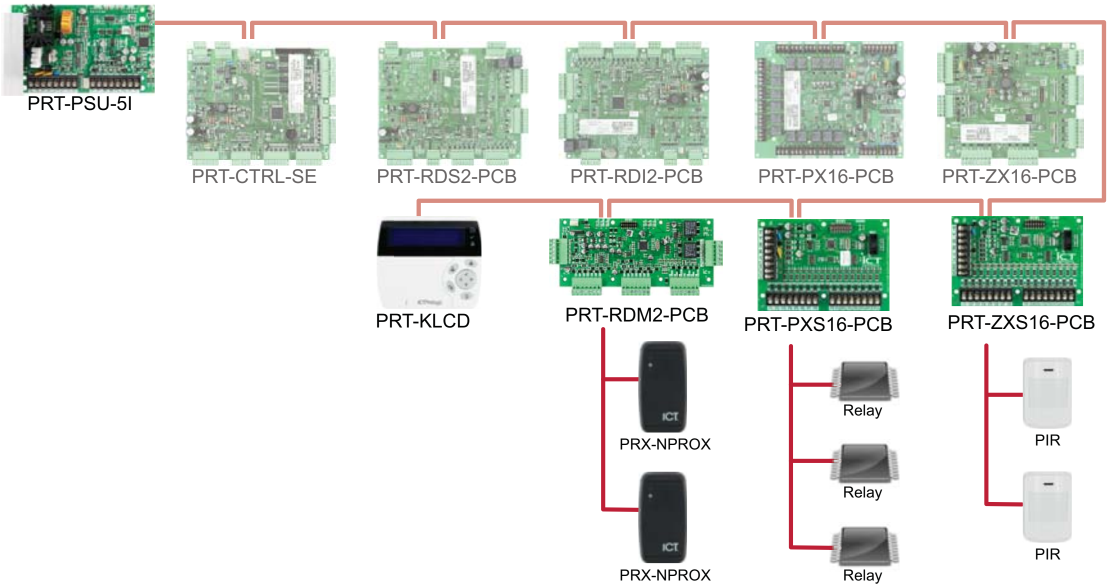
Note: In this scenario, 12VDC must be wired from the module's 12V Auxiliary supply to the module network 12V terminals. **This must only be done on one module on the network.**

Module Network Powered Devices

Module network powered devices are **not** optically isolated from the RS-485 Module Network and draw all of their power **directly from the Module Network**

- PRT-KLCD LCD Keypad Module.
- PRT-RDM2 Mini Two Reader Module.
- PRT-ZXS16 Standard 16 Zone Input Expander
- PRT-PXS16 Standard 16 Output Expander
- And all of the DIN Rail range...

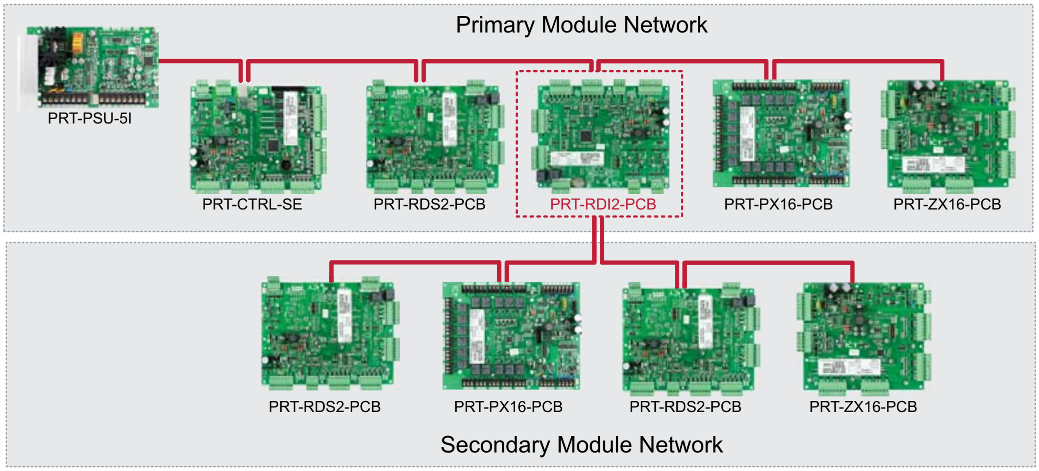
The device and **any devices** connected to it **ALL** draw their power from the module network.



You must include **all** connected devices when considering power supply loading and voltage drop

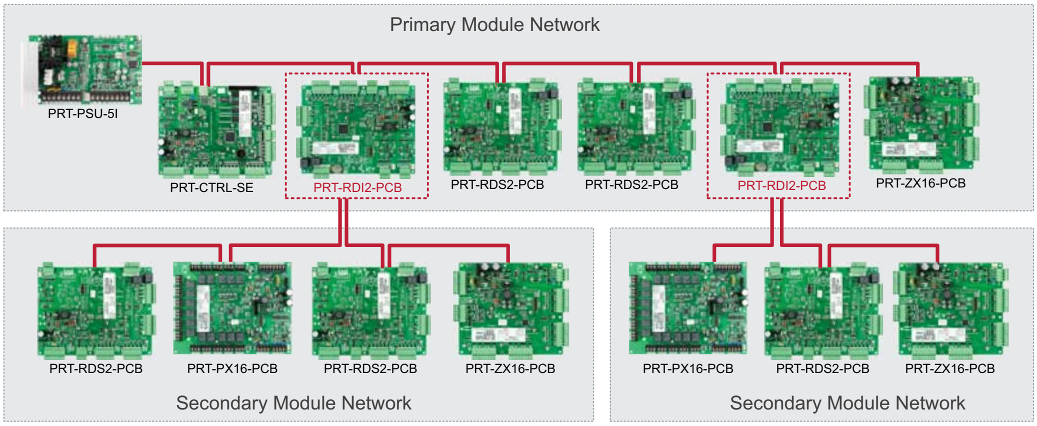
Expanding the Module Network

Expansion of the Module Network can be done using the PRT-RDI2 module. This uses a secondary communications port which is isolated to allow a stub or spur network to be created.

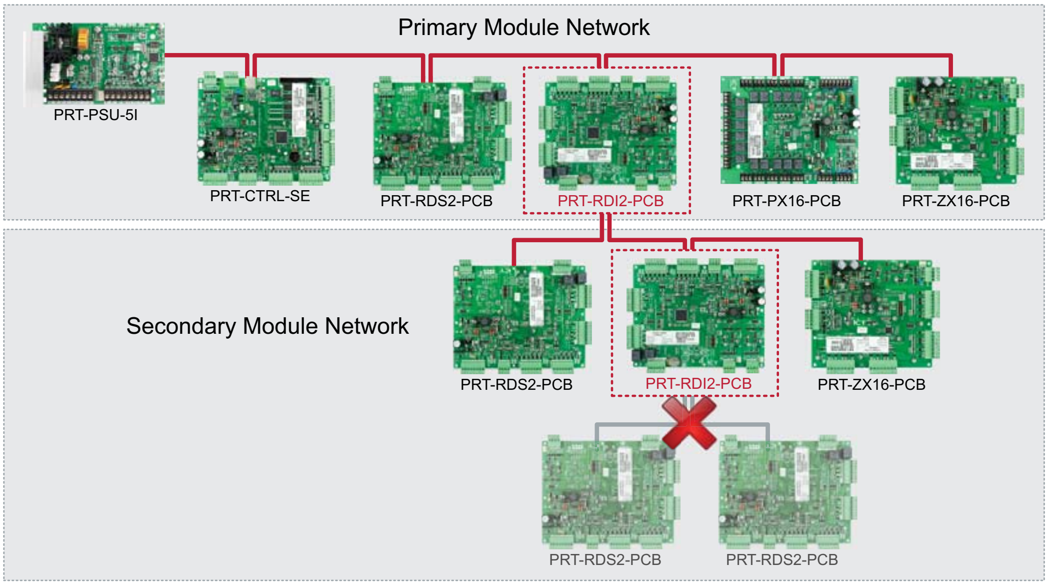


The same rules apply to the stub or spur network as the main network connections.

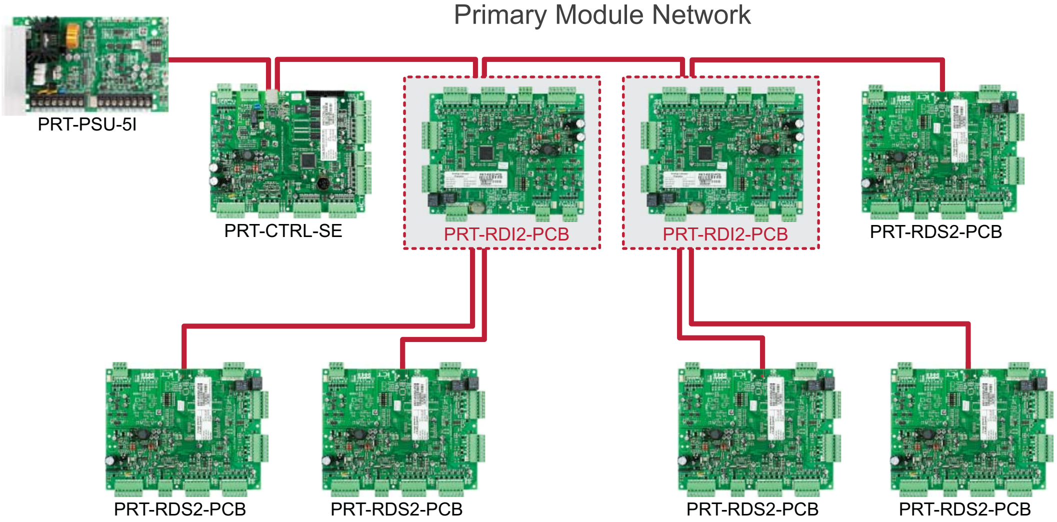
Multiple secondary networks are allowed, as long as they all come off the **primary** network.



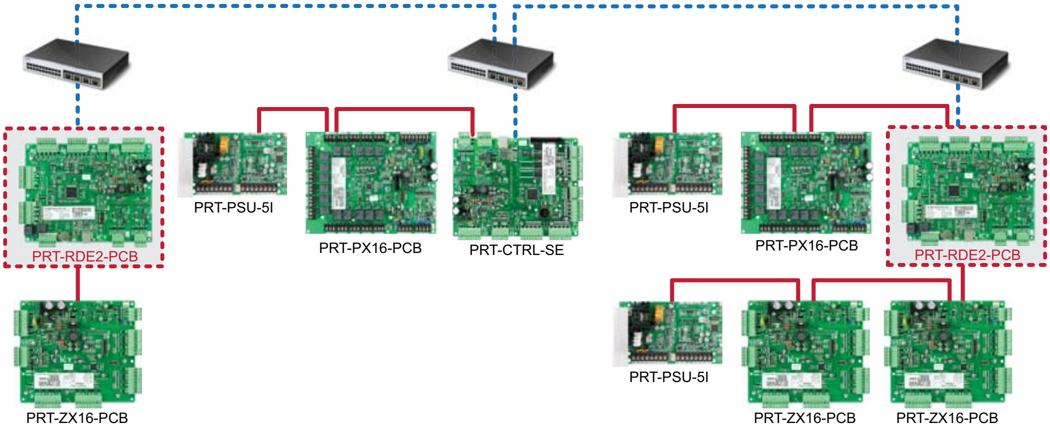
Additional stubs or spurs **cannot** be taken from the secondary network



Use secondary module networks where daisy chain wiring is not practical



RDE2 expanders use **Ethernet** to communicate with the controller providing another way to expand the Module Network



A biasing adapter **must** be installed when using the primary 485 interface as a network repeater

Proximity Readers

Wiegand Interface

ICT offers a range of Proximity Readers and Reader Expander modules. A standard Wiegand interface means that ICT Readers can be used on any system that supports standard Wiegand readers. It also means that we support 3rd party standard Wiegand readers.

- Maximum cable run from Reader to Expander = 150m
- Approved cable types = 22Awg alpha 5196, 5198, 18Awg alpha 5386, 5388

The Wiegand interface and communications protocol are not an ICT or Protege proprietary standard. See http://en.wikipedia.org/wiki/Wiegand_interface for more information.

125Khz Card Readers

ICT 125KHz Card Readers offer superior functionality by being programmed to read all popular 125KHz cards including Position Technology, HID, Paradox and ICT cards. The card reading technology is selected via the reader programming.

LED Operation

Dual LED Outputs and independently operated beeper connections allow card readers to integrate with all existing and new installations. The units are programmable using a programming card.

In single LED operation the unused spare LED input can be programmed to function as a command button for Wiegand control messages (REX, REN, arm button).

Feature Highlights

- Bi color LED (red and green) with independent or single LED control
- Programmable Wiegand data formats from 26 to 128 Bit with card configured Output
- Keep alive transmission every 30 seconds for intelligent tamper management
- Fully encapsulated design for outdoor and indoor operation
- Beeper activation does not prevent card read operation
- LEDs and Beepers can be used for other functions such as displaying area arming status
- Extensive programmable features using programming card

Comparison

- The Nano Prox reader is small, unobtrusive and cost effective
- The Vario boasts an extended read range of up to 150mm with clamshell cards
- The Multi Prox includes a PIN pad allowing multiple authentication combinations using card and/or PIN

13.56 Mifare Desfire Readers

The ICT Mifare DESfire range of readers provide a complete open standard DESfire smart card RFID solution compatible with DESfire EV1 Cards, Mifare Classic MAD (Mifare Application Directory), Mifare S and X, specific managed sector and ESN/CSN decoding.

Compatible with ALL Wiegand data capable control systems and incorporating RS-485 communication they allow rapid deployment of secure DESfire RFID technology in any environment.

The DESfire range offers superior functionality and independent operation using open DESfire technology and is capable of decoding and sending up to 128 Bits of information in the Wiegand format or full sector information in the EIA485 protocol.

Migration

Migration from legacy and insecure low frequency technology (125KHz) is easily achieved using dual technology DESfire Proximity ISO Cards that incorporate both high and low frequency card inlays. Program the card using ICT's universal programmer with the specific site and card number required. Support for a number of low frequency products is possible.

Compatibility

Compatible with a large number of integration solutions. ICTs DESfire series of products has been successfully deployed in many integration solutions from cost recovery for printing and services to vending and cashless solutions.

Encryption

ICT's DESfire technology also integrates 256 Bit AES encryption with user selectable keys, reinforcing our support for open technology and standards.

Reader Technology Comparison

	Mifare Desfire EV1	125KHz
Secure card format	✓	
ON card data storage	✓	
Open architecture platform	✓	
Cost effective		✓
Extended read range		✓
Reads common cards		✓

Keypads

Protege Alphanumeric LCD Keypad (PRT-KLCD)

The Protege Alphanumeric LCD Keypad provides a user friendly human interface to the Protege integrated access control, security and building automation system.

Feature Highlights:

- Securely login with user codes from 1 to 8 digits with support for card reader and PIN code operation
- Intuitive menu function allows scrollable options according to user security level with quick access shortcut keys for the power user
- Dual code and master code provider functions for secure ATM and banking vault area access with automatic time-out and delayed opening functions
- Unique reportable duress code for each Protege Alphanumeric LCD Keypad
- Activation of 3 x reportable panic events (Panic, Medical and Fire)
- Smoke detector reset provided on clear and enter keys selectable for a PGM or PGM group

Arming/Disarming

Allows a user to arm and disarm an area or group of areas:

- Area progress is shown on the LCD display with user friendly plain text messages displayed to the user as it guides them through the arming or disarming procedure.
- Easily view open system zones during the pre-arming phase
- Local display of user area for quick arming and disarming confirmation.
- Direct zone bypass option

System Object Control and Monitoring

Monitoring of all objects within the system can be achieved from the Protege Alphanumeric LCD Keypad:

- Monitor the status of any Door, User (anti-pass back), Zone (Input), PGM (Output) or schedule directly at the keypad
- Offline functions allow Quick Key menu functions to be performed on objects used for automation (lights, HVAC, electric gates and doors)
- Single automation quick key for REX (Door Request To Exit) or PGM Output activation

Auto Logout Confirmation

The Protege Alphanumeric LCD Keypad can be programmed for a custom auto logout time specific to each station.

Connectivity and System Expansion

Expanding the Protege System with local zone (input and PGM Output) from the Protege Alphanumeric LCD Keypad allows convenient cost effective expansion:

- 2 zones (4 using zone duplex) can be used to perform any system alarm and automation functions with a dedicated enclosure tamper switch
- 1 low current PGM Output for driving any signaling device
- Two controllable LEDs on the display
- Controllable buzzer
- Intelligent backlight to minimize power consumption
- Configuration and addressing of the keypad is achieved by a simple easy to follow configuration menu available during initialization

Protege Eclipse LED Keypad (PRT-KLES)

The Protege Eclipse LED Keypad offers a sleek, user friendly interface to the Protege system, providing area control and security zone status at a glance.

Feature Highlights:

- Sleek and stylish to fit in with modern decor, providing a user friendly interface to the Protege alarm functions
- 4 onboard zones
- 1 PGM output
- Capacitive touch keypad
- Fire, Panic and Medical alarm options
- Up to 20 zones per Area can be used for Delay, Instant, Follow, Fire, Fire Delay and 24 Hour Operation
- Conforms to the UL/ULC fire control specifications
- Simple single Area control
- Door unlock operation
- Integrated tamper switch

Protege Control

Operating in the Protege Control mode the Protege Eclipse LED Keypad provides a complete standalone 4 zone, 8 user local alarm system:

- Operates autonomously when communication fails without the need for a Protege Integrated System Controller
- Locally program siren, entry and exit delay timers and configure the operation of up to 8 users with arming and disarming options
- 4 zones (zone duplex) for delay, instant, follow, fire, fire delay and 24 hour operation
- Configuration and addressing of the Keypad is achieved by a simple easy to follow configuration menu available during initialization
- Communicate with up to 3 slave Protege Eclipse LED Keypads for expansion to 18 zones and operation of multi-floor penthouse apartments

Protege Touchscreen Keypad (PRT-TLCD)

The Protege Touchscreen Keypad eliminates the need for a myriad of keypads, control panels and switches for each part of a system, offering true integration in any building environment.

Feature Highlights:

- 12VDC power supply input with intelligent power saving mode
- Communication with the Protege Integrated System Controller via Ethernet
- 2 monitored zone inputs or 4 with duplex zone operation
- 1 programmable open collector Output, suitable for digital or relay control
- 10/100 Ethernet with link/data status indicator
- 128MB onboard RAM, 256MB flash storage space

Mounting Options

With a thickness of only 22mm, the Protege Touchscreen Keypad complements any building interior. The keypad can be mounted over a traditional flush box mount requiring only 15mm depth inside the wall cavity. The widescreen unit complements and enhances any building interior, with custom frame inserts available on special order to truly synchronize interior designs.

Installation Wiring

Power is provided via a 12VDC power supply. Ethernet connection allows installation using a dedicated Protege Network (recommended for multiple touchscreen installations) or by simply connecting the Protege Touchscreen Keypad and Protege Integrated System Controller into the buildings existing network.

Networking Capabilities

The 10/100 Ethernet network connection is completely configurable via the onboard setup menu or the touchscreen builder software.

Protege Control

Use the Protege Touchscreen Keypad to create custom menus and displays that allow control and viewing of any inputs and outputs in the Protege System. Create floor plans to display this information in a concise and powerful way

Graphics and Video Capabilities

Create a unique user experience with a blend of high quality graphics and customizable images which can be displayed up to 640 x 480 resolution.

Audio Capabilities

Play high definition audio from WAV, MP3 or WMA files to announce events, warn and inform users of alarm or other input status. Voice notification of network status is built in for ease of installation

Touchscreen Builder Software

Build a menu system completely customized for each installation. Create pages for access control, security, and automation for any building or combine all key functions into a floor plan or main page

Temperature and Humidity Sensors

Protege Temperature and Humidity Sensor (PRT-ATH1)

The Protege Temperature and Humidity Sensor is designed to measure temperature and humidity. It can operate in standalone mode or can be connected to the Protege system.

Technical Specifications:

- Operating Current: 20mA (typical)
- Inputs: 1 module tamper
- Outputs: 2 relay outputs (100mA max), 2 programmable LEDs
- Comms: 1 non-isolated RS-485 port

Note: The ATH1 draws its power from the RS-485 Module Network.

Features

The ATH1 has an internal temperature and humidity sensor as well as the circuitry for an external k-type thermocouple temperature sensor:

- Temperature sensor -40˚C to 60˚C (±1˚C) -40˚F to 140.0˚F (±2˚F)
- Humidity sensor 0% to 100% (±3%)
- Secure encrypted RS-485 module communications
- Channel deviation trigger level
- 2 low current PGM Outputs
- 2 display LED PGM Outputs
- 2 0 to 10V or 4 to 20mA analog Outputs (ACC-ATH1 only)
- 8 to 30VDC input power supply
- Online and remote upgradable firmware

Enclosures

Throughout the training so far, you will have seen how many of each module fits into our cabinets. Now we will have a look at the cabinets and see how they fit together.

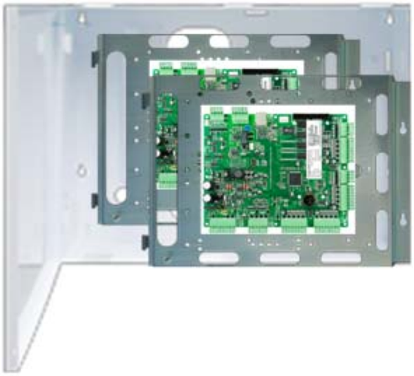
Enclosure Specifications

	Medium EN-ST-2828	Large EN-ST-4133	Fatboy EN-GPT_3850	Jumbo EN-GPT-6150
Dimensions	280 x 280 x 85	410 x 335 x 95	388 x 508 x 170	610 x 508 x 170
Half Modules	1	1	2	4
Quarter Modules	-	1	4	8
Transformers	1	1	2	4
Batteries	1	2	2	4
Gear Plates	-	-	✓	✓

Gear Plates

The medium and large enclosures are not able to take gear plates. These are standard enclosures which have PCB installed in them using plastic push through stand-offs. Transformers are screwed in to the chassis.

The Fatboy and Jumbo enclosures use a system of gear plates for mounting. PCBs are mounted to the gear plates, and cabling is hidden and fastened behind the gear plates. This creates a much tidier way to wire your enclosures, and by layering gear plates allows more equipment to fit in an enclosure.



Gear plates come in top and bottom versions of half and quarter sizes. Bottom plates sit at the back of en enclosure, top plates fit on top of bottom plates creating a second layer.

Transformers are mounted at the left and have a metal cover to keep them isolated from low voltage components. Cable management fingers allow incoming cables to be bunched together neatly.

Elevator Control

Interfacing with elevator controllers to achieve access control to floors can be done either high level or low level. Configuration of elevator control is not covered in this module which simply aims to advise what equipment is required to achieve low level elevator floor control.

Low level elevator control is achieved by controlling the user's ability to select floors in the elevator car. This is done by supplying a set of clean contacts to the elevator control system for every floor that needs to be locked off. The access control system then enables and disables floors by changing the state of the contacts.

Typically, when a user badges their card at the reader located in the elevator car, the access control system turns the relays on for the floors that the user is allowed access to. After the lock timeout, the relays are turned off again, locking the floor select buttons off again.

There are two main problems with this:

1. Security: For the period that the relays are on, multiple floors can be selected. Two people could enter an elevator, one could badge their card and select a floor. The other could then press buttons until another floor is selected.
2. Reporting: There is no way for the security system to report on where the user went, or if indeed access was taken. All we get is an access request.

Destination Reporting

Destination Reporting can be implemented to improve security. This involves providing a set of isolated inputs to the elevator control system, which receive feedback on which floor buttons are pressed.

With Destination Reporting enabled, the user badges their card, the floor relays energize for the floors they are permitted access to, but now when they select a floor the system sees the button press. In response, the system turns the floor relays off to prevent any other buttons being pressed and logs an event showing which floor the user selected.

Hardware Requirements

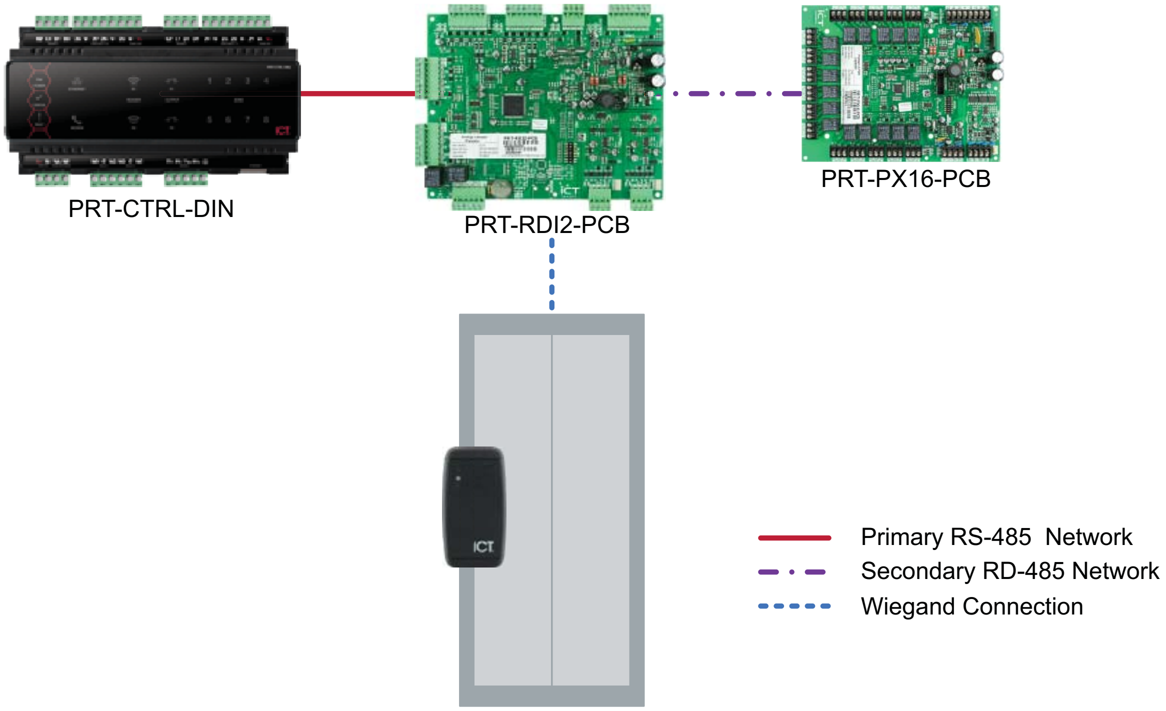
At this stage, there is not yet a full DIN Rail solution so implementing elevator control in Protege GX requires PCB hardware.

- An intelligent reader expander (RDI2 or RDE2) is required for every two lifts you need to control. Each expander provides two reader ports, one per lift car.
- The secondary RS-485 port is used to interface with PX16 output modules which become dedicated for low level elevator control.
- PX16 expanders are added based on number of floors that require controlling. The last PX16 added can be split in half if required with the first 8 relays controlling one lift car and the second 8 relays controlling the second lift car.
- For Destination Reporting, Protege Destination Reporting Interfaces (PRT-PX16-DRI) are interconnected to the PX16 modules.

Example: Single Car System

To control a single elevator with 1 to 16 controlled floors and no Destination Reporting, you would need:

- 1 System Controller
- 1 PRT-RDI2 or PRT-RDE2
- 1 PRT-PX16
- 1 Card Reader



Example: Three Cars with Different Floor Ranges

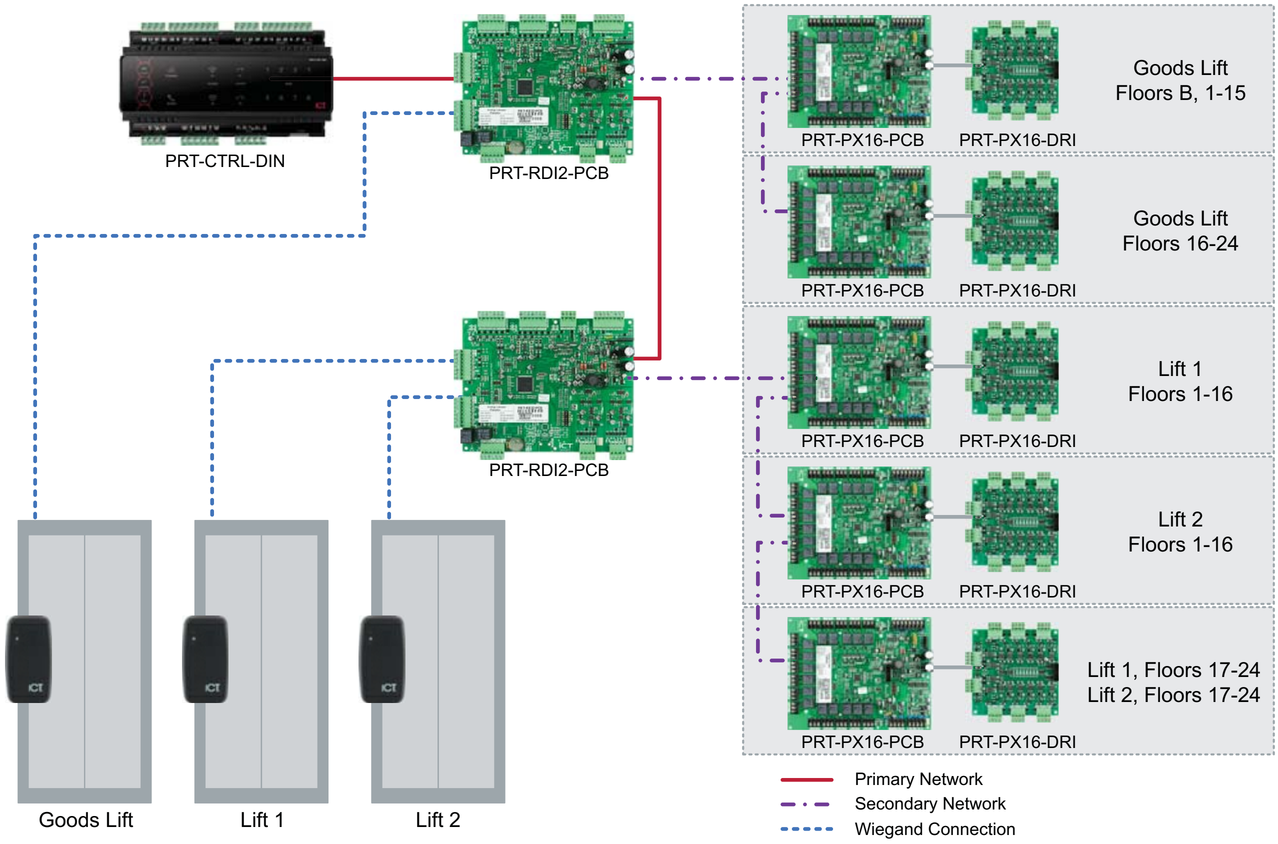
Now let's look at an example where there are two lifts covering from Ground to Level 24, and a goods lift covering the Basement to Level 24. The end user would also like Destination Reporting.

You would need:

- 1 System Controller
- 2 PRT-RDI2 or PRT-RDE2 modules
- 5 PRT-PX16 modules
- 5 PRT-PX16-DRI modules
- 3 Card Readers

The PRT-PX16 modules would be configured to control the following:

- #1: Goods Lift, Floors B-15 (16 total)
- #2: Goods Lift, Floors 16-24 (9 total)
- #3: Lift 1, Floors 1-16 (16 total) - the ground Floor does not need to be controlled
- #4: Lift 2, Floors 1-16 (16 total)
- #5: Lifts 1 & 2, Floors 17-24 (16 total)



Review Questions

How many access controlled doors can be directly connected to the DIN Rail Controller?

- □ 0
- □ 1
- □ 2
- □ 4

How many onboard high current relay outputs does the DIN Controller have?

- □ 2
- □ 4
- □ 7
- □ 500+

How many onboard inputs does the RDM2-DIN Reader Expander have?

- □ 7
- □ 6
- □ 8
- □ 4

If installing a system with two doors (both with readers for entry and exit), how many Reader Expanders are required?

- □ Two. Each Reader Expander has two reader ports onboard.
- □ One. With reader multiplexing, a single Reader Expander can support two doors with entry and exit readers.
- □ None. The Controller supports reader multiplexing, which allows two doors with entry and exit readers to be controlled onboard.
- □ One. The Controller has two reader ports onboard so a reader expander is required for the other two readers.

Which of the following offsite reporting paths are supported by the DIN Rail Controller?

- □ IP Reporting via the Ethernet port
- □ Contact ID via the built in dialer
- □ SIA via the built in dialer
- □ All of the above

How many onboard reader ports does the PCB Controller have?

- □ 0
- □ 1
- □ 2
- □ 4

How many onboard readers does the PCB Controller support?

- □ 0
- □ 1
- □ 2
- □ 4

What's the most RDM2-PCBs you can fit in a Jumbo Cabinet?

- □ 1
- □ 2
- □ 4
- □ 8

What is the maximum distance that the Protege Module Network may be run?

- □ 100m
- □ 900m
- □ 1200m
- □ 1500m

A project requires a run of 300m (1000ft) between the Controller and the nearest Ethernet switch. Which cable type should I use?

- □ You can't - the maximum cable run between a Controller and a switch is 100m (328ft)
- □ Belden 9842 or 24AWG security cable
- □ Belden 9842 or CAT5e
- □ Belden 9842

In a new installation, how many spurs can come off a Controller on the RS-485 module network?

□ 3

□ 4

□ 250

□ None - star or spur wiring is not an acceptable method for new installations

Can multiple power supplies be connected to the Protege Module Network?

□ No, the Module Network must only be powered at one location

□ Yes, as long as the N+ connection is removed between the split sections

□ Yes, as long as they are all in the same cabinet

□ Yes, as long as they are all in different cabinets

If a door needs to operate in card and PIN mode, which reader should be used?

□ The Nano Prox reader

□ The Multi Prox reader

□ The Vario reader

□ The Vario PIN reader

If an ICT reader is connected to an ICT reader expander, is tamper monitoring possible?

□ Yes, ICT readers and expanders can be programmed for intelligent tamper recognition.

□ Yes, ICT readers include a tamper switch.

□ Yes, ICT reader expanders include a tamper input.

□ No, there is no tamper monitoring on ICT readers.

What is the maximum cable run for an ICT reader connected to an RDM2-DIN Reader Expander?

□ 75m

□ 100m

□ 125m

□ 150m

How many onboard controllable outputs does the PRT-KLCD have?

- □ None
- □ 1 low current output
- □ 1 low current output and two controllable LEDs
- □ 1 low current output, two controllable LEDs and a controllable buzzer

How many inputs does a PRT-KLCD keypad have onboard?

- □ None
- □ 1 input (2 using zone duplex)
- □ 2 inputs (4 using zone duplex)
- □ 4 inputs (8 using zone duplex)

What is the ATH1 module used for?

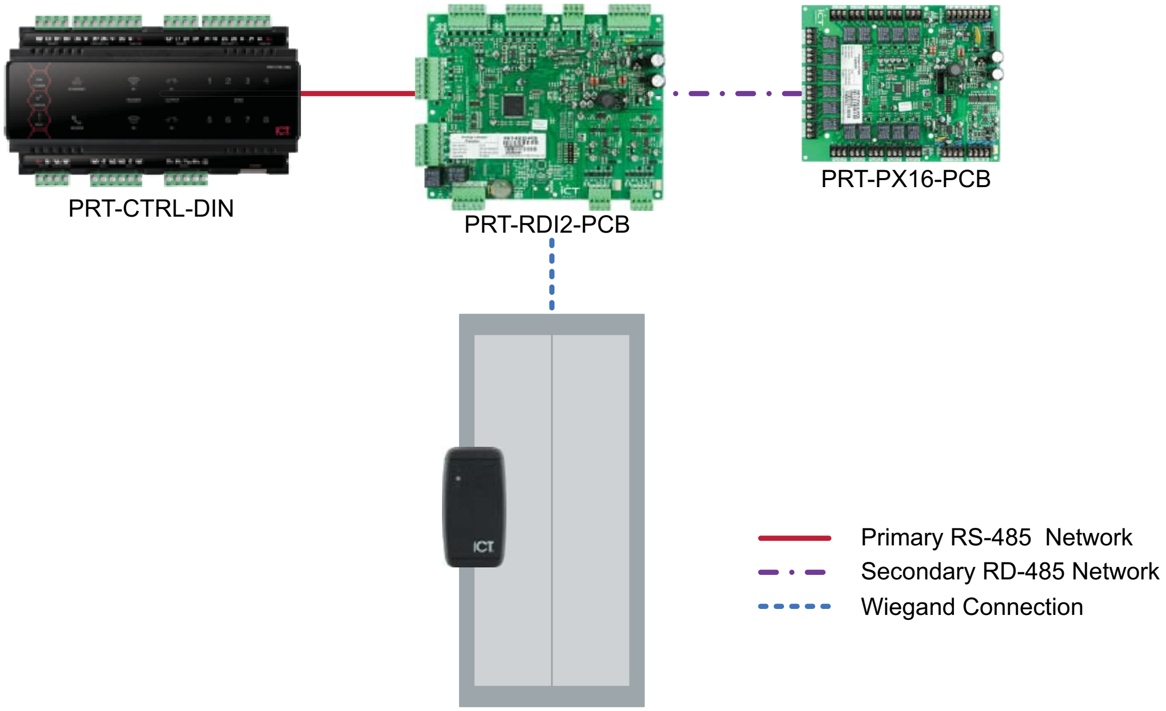
- □ Arming and disarming areas
- □ To measure temperature and humidity
- □ Reading smart cards
- □ Programming smart cards

Complete this statement

Gear plates must be used in...

- □ Large and Jumbo cabinets
- □ Fatboy and Jumbo cabinets
- □ Medium and Large cabinets
- □ Fatboy and Large cabinets

With a single car elevator system configured as shown, what is the maximum number of floors that could be controlled?



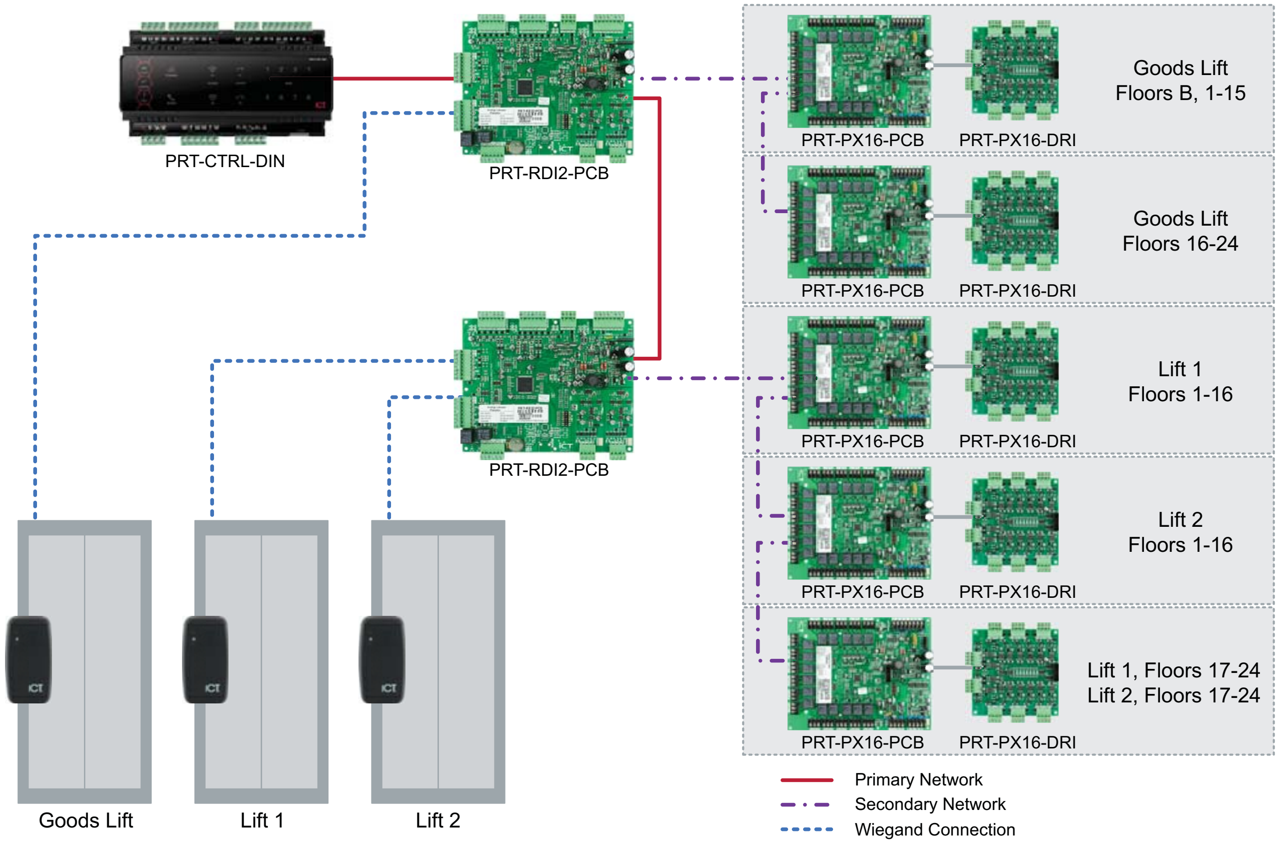
□ 8

□ 16

□ 128

□ Unlimited

In addition to basic access control, what optional feature is also shown in this scenario, and what is it for?



□ Direct Reader Interface, allowing a high level interface to the lift control system

□ Destination reporting, which allows Protege to see which floor an elevator car is on

□ Destination reporting, to prevent more than one floor being selected when a card is badged

□ Destination reporting, allowing connection to a destination based elevator control system

Module 126:
Limitations of SE Hardware in Protege GX

ICT strive to maintain backwards compatibility on software and hardware wherever possible to enable clients to access the latest features and technology without having to upgrade their entire system. With the exception of Controllers, all ICT hardware (both DIN-Rail and PCB) is compatible on both Protege SE and GX systems. This module outlines the limitations that apply.

In This Module

System Controller Compatibility

To take full advantage of the Protege GX capabilities, the PRT-CTRL-DIN is required.

All System Controllers apart from the PRT-CTRL-LE are compatible with Protege GX however there are some restrictions.

The PRT-CTRL-SE and PRT-SE-RACK both require a firmware upgrade in order to work with GX systems. The PRT-CTRL-GX, PRT-CTRL-SE and PRT-SE-RACK are all subject to certain limitations when running on the GX system.

	Compatible with SE Software?	Compatible with GX Software?
PRT-CTRL-DIN	No	Yes
PRT-CTRL-GX	No	With Restrictions
PRT-CTRL-SE	Yes	With Restrictions & Firmware Upgrade
PRT-CTRL-LE	Yes	No
PRT-SE-RACK	Yes	With Restrictions & Firmware Upgrade

Memory Limitations

The newer DIN Rail controller has a much larger storage capacity and a more powerful processor, enabling us to change the way we store and look up information. Because of the smaller storage and lower processing power, the PCB Controllers (PRT-CTRL-GX, PRT-CTRL-SE, and PRT-SE-RACK) have certain limitations imposed when running on a GX system. PCB Controllers require a fixed structure in the database to ensure efficiency. As DIN Rail Controllers have more power, the fixed structure is no longer required, allowing a dynamic database (meaning more flexibility and no limitations on particular records).

These limitations are implemented by restricting the number of records each Controller can store:

Description	Number
Access Levels	248
Analog Expanders	8
Area Groups	32
Areas	32
Automation Points	32
Data Values	248
Door Groups	248
Doors	64
Elevator Car Groups	8
Elevator Cars	8
Elevator Floor Groups	32
Elevator Floors	128
Events	2000
Holiday Groups	16

Description	Number
Input Expanders	32
Keypad Groups	16
Keypads	32
Menu Groups	16
Output Expanders	8
Output Groups	128
Programmable Functions	64
Reader Expanders	32
Schedules	128
Services	8
Users	5000
Access Levels (per user)	4
Access Cards (per user)	2
Variables	248

For a complete list, refer to the PRT-GX-SRVR Installation Guide.

Controller Comparison

Records	PCB Controller running GX Firmware	Protege GX DIN Rail Controller
Cards per user	2	8
Access Levels per user	4	32
Doors in Access Levels	Not supported	16
Door Groups in Access Levels	1 per controller	8
Floors in Access Levels	Not supported	16
Elevator Groups in Access Levels	1 per controller	8
Floor Groups in Access Levels	1 per controller	8
PGM Groups in Access Levels	1 per controller	1
Menu Groups in Access Levels	1 per controller	1
Arming Area Groups in Access Levels	1 per controller	8
Disarming Area Groups in Access Levels	1 per controller	8
Outputs in Access Levels	1 per controller	16
Output Groups in Access Levels	1 per controller	1
Doors in a Door Group	64	64
Areas in an Area Group	128	128
Keypads in an Area Group	16	16
Outputs in an Output Group	24	24
Holidays in a Holiday Group	16	16
Elevators in an Elevator Group	128	8
Floors in a Floor Group	128	128

Storage Allocation

To assist in saving memory on the PCB Controllers, the Controller memory profile has a number of record types that have restricted or no storage space allocated for the names assigned to records.

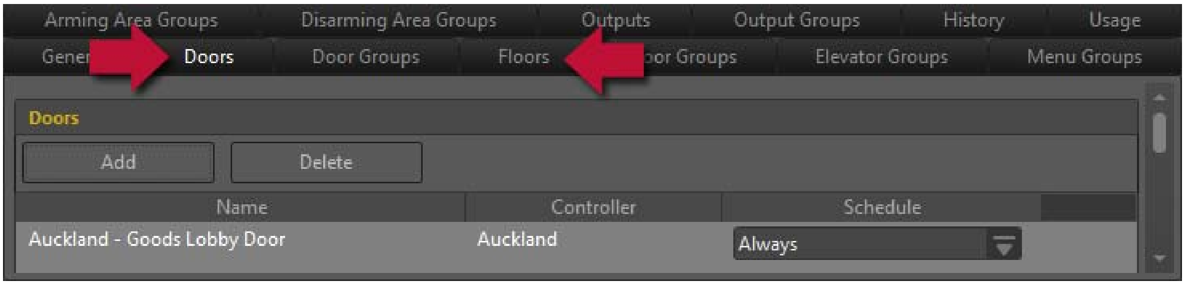
For example, the Controller can store up to 5000 users but there is only storage space allocated for the names of the first 2000 users. This means that users 2001 – 5000 will not see their name displayed when logging in at an LCD keypad, but will instead get a welcome message such as "Good Morning User 2001".

This only affects the display of devices connected to the controller (such as keypads) and does not mean that events or reports created at the server have no names.

Feature Limitations

The other issue affecting compatibility relates to physical hardware restrictions. New features sometimes require a physical change to the hardware as well as changes to software and firmware. You should always check the hardware release notes to ensure that the hardware version you have will support the feature.

An example of this is where Access Levels allow you to add individual Doors or Floors. This feature is not supported by PCB Controllers, and requires specific firmware to run on the DIN Rail Controller.



Name	Controller	Schedule
Auckland - Goods Lobby Door	Auckland	Always

Exceeding Limitations

The Protege GX Server has no restrictions on the number of records that can be programmed. If you create too many records for the Controller, the Server still attempts to download the data to the Controller.

When the Controller receives a record that it does not have room to store, it sends a System Assertion event back to the Server. These events are seen by the Server and added to the Health Status of the Controller, so the technician on site is made aware of the problem.

Review Questions

Can an RDM2-PCB Reader Expander be connected to a DIN Controller on a GX System?

□ Yes, it is fully supported

□ No, it is only compatible with a PCB Controller

□ Yes, but it requires a firmware upgrade

□ No, it is only compatible with SE systems

When running GX with a PCB Controller, what greeting would 'Gordon Groves' see at a keypad if he was user number 4999?

□ Good Morning User 4999

□ Good Morning Gordon Groves

□ Nothing, only 2000 users are supported by the PCB Controller on GX

□ Protege GX By ICT

When running GX with a PCB Controller, what is the maximum number of users it can store?

□ 5 million

□ 5000

□ 2000

□ 10000

How many doors can be assigned to an access level on a GX system running on a PCB Controller?

□ None, this is not supported by the PCB Controller

□ 2

□ 4

□ 8

If a Controller limitation is exceeded, what happens?

□ Nothing, the Controller ignores anything it can't fit or doesn't know about.

□ The server displays an error.

□ The Controller fault light comes on solid and the status light flashes three pulses.

□ The Controller sends a System Assertion event to the Server. The server displays a message in the Controllers Health Status

Module 127:
Protege DIN Rail Hardware Configuration

This module outlines the requirements for setting up and configuring DIN Rail hardware.

In This Module

DIN Rail Hardware Setup

The Protege System is an advanced technology security system designed to provide integration with building automation, apartment complex control and HVAC in one flexible package. Communication is over a proprietary high speed protocol across an AES encrypted local area network and an encrypted proprietary RS-485 module network. Using modular-based hardware design, system installers have the flexibility to accommodate any installation whether it's small, large, residential or commercial.

Flexible module network architecture allows large numbers of modules to be connected to the RS-485 Module Network. Up to 250 modules can be connected to the Protege System in any combination to the network up to a distance of 900M (3000ft). Communication beyond this distance requires the use of a RS-485 Network Extender

Mounting

The Protege DIN Rail range is supplied as DIN Rail mount modules and are designed to mount on standard DIN Rail either in dedicated DIN cabinets, Protege Jumbo Cabinet Enclosure with DIN Rail Gear Plates, or generic DIN Rail mounting strip. A section of this DIN Rail strip is provided as a mounting option.

When installing the DIN Rail module ensure that there is adequate clearance around all sides of the enclosure and air flow to the vents of the unit is not restricted. It is recommended to install the unit in a location that will facilitate easy access for wiring. It is also recommended that the unit is installed in electrical rooms, communication equipment rooms, closets or in an accessible area of the ceiling.

1. Hook the lower tabs under the bottom edge of the DIN Rail.
2. Push the unit against the DIN Rail mount and press firmly on the top center of the Controller until the upper tab clips over the upper rail.

To reduce the risk of damage caused by debris during the installation, install the cabinet enclosure when the unit is not installed on the rails.

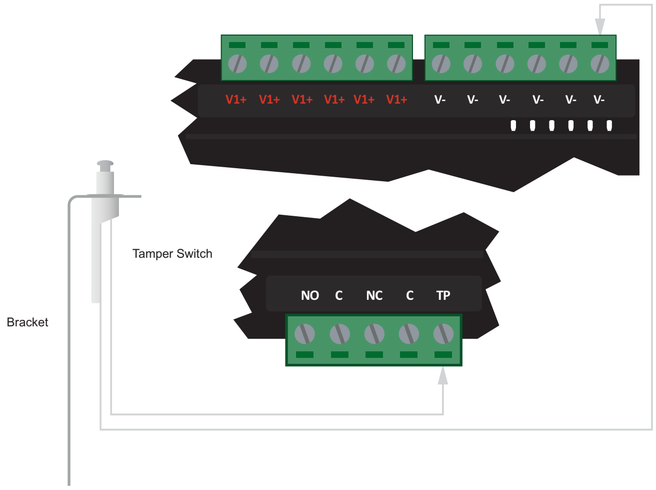
Removal

The unit can be removed from the DIN Rail mount using the following steps:

1. Insert a flat blade screwdriver into the hole in the white tab at the top center of the Controller.
2. Lever the tab up and rotate the unit off the DIN Rail mount.

Cabinet Tamper Switch

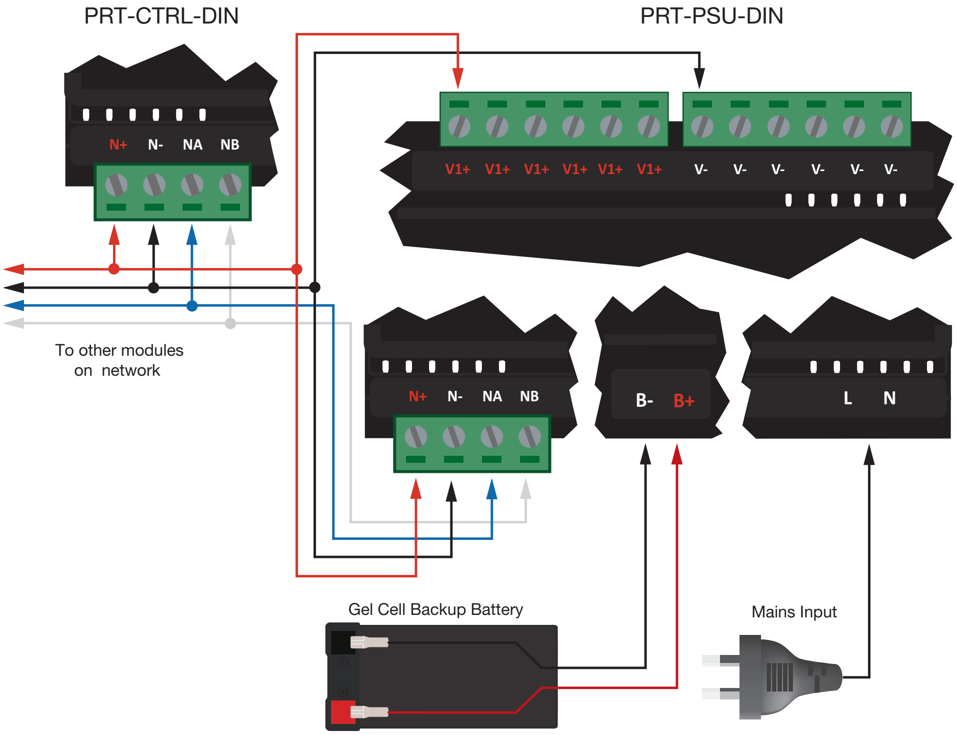
The PSU-DIN includes an onboard enclosure tamper input. This tamper input signals to the monitoring station or remote computer that the enclosure has been opened. The tamper input switch should be mounted into the steel bracket provided and connected to the tamper connection terminal and the V- terminal as shown below.



Connections

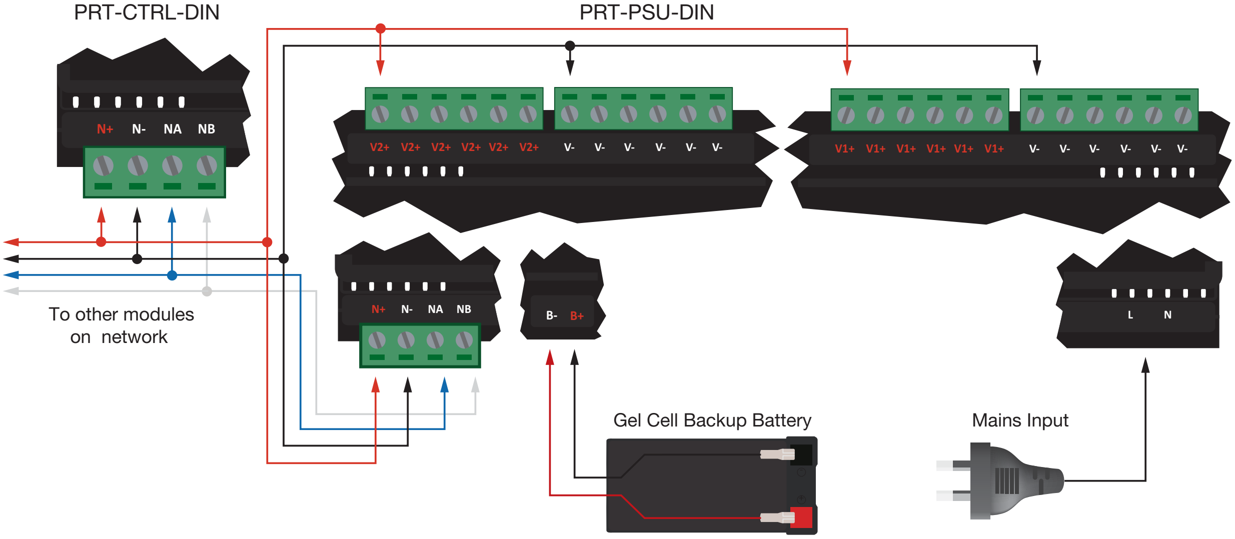
Power Requirements

Protege DIN Rail hardware is supplied by a 12V DC power supply connected to the N+ and N- terminals. It does not contain internal regulation or isolation. It is recommended that an ICT PRT-PSU-DIN is used for this purpose, although any clean 12V DC supply would be suitable.



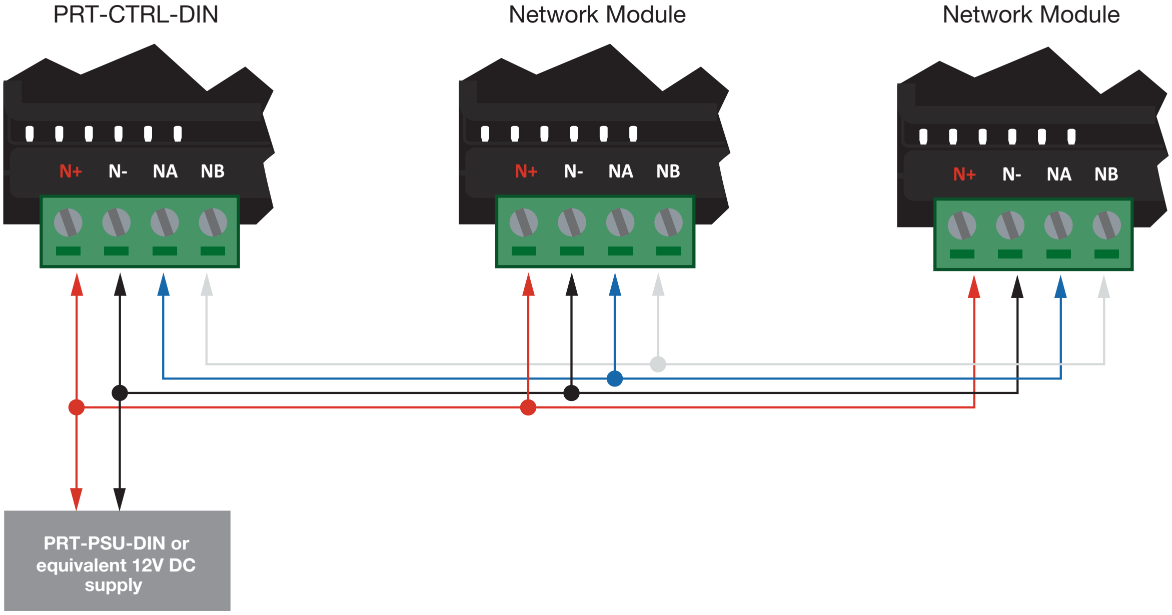
In the configuration shown above, a maximum module network load of 3A can be supplied. This includes all expanders and connected ancillary devices such as readers and PIRs.

When a PSU-DIN is dedicated to module network power, both outputs can be wired in parallel. In this configuration, a maximum module network load of 4A can be supplied. This includes all expanders and connected ancillary devices such as readers and PIRs.

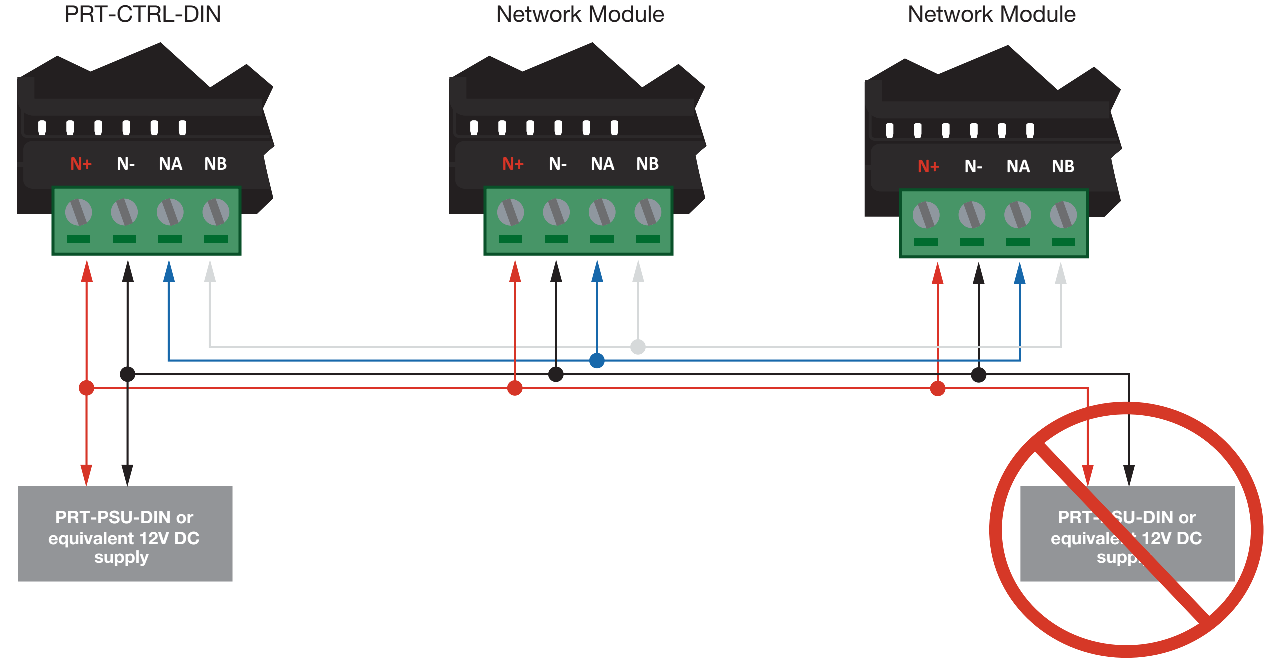


The total average PSU loading should be kept below 75% of its rated output. This leaves adequate available supply for fluctuations caused by peak loading or if a field device should become faulty. It will also extend the service life of the power supply.

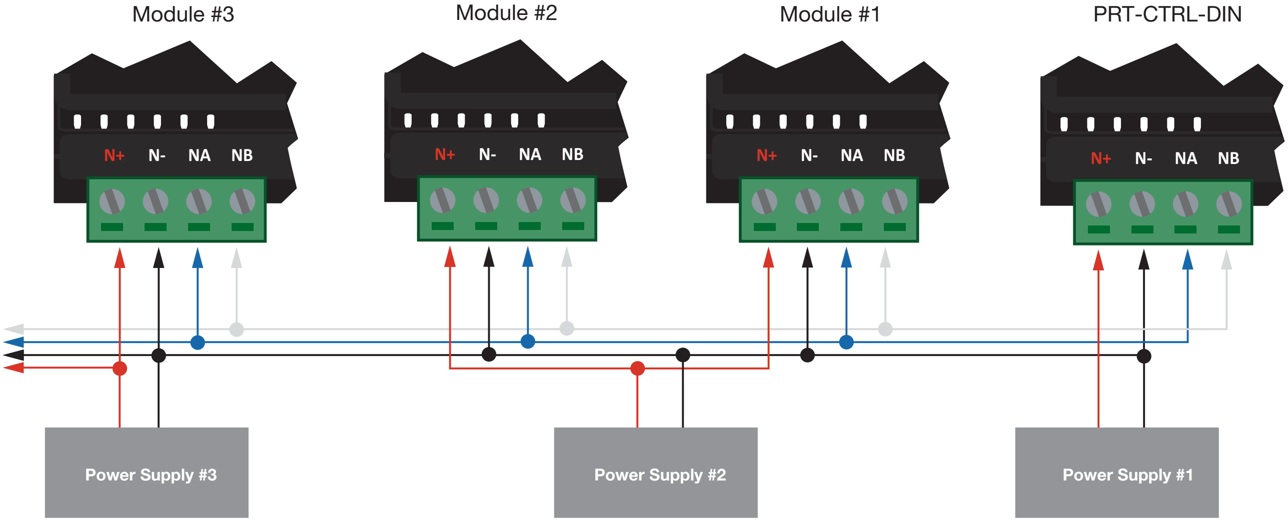
It is recommended that that the power supply used to power the module network is dedicated to this task, and is not used to power other devices, especially noisy devices such as locks. In a small installation this can be achieved by a single PSU, so long as the maximum load of the power supply is not exceeded.



Each section of the Module Network must be supplied from only one point. Connections from more than one 12V supply may cause failure or damage to the units supplying power.


PRT-CTRL-DIN
Network Module
Network Module
N+
N-
NA
NB
PRT-PSU-DIN or equivalent 12V DC supply
PRT-PSU-DIN or equivalent 12V DC supply

In larger installations, the Module Network power supply may need to be split to allow for load sharing between several supplies. This is done by removing the N+ connection from between split sections.

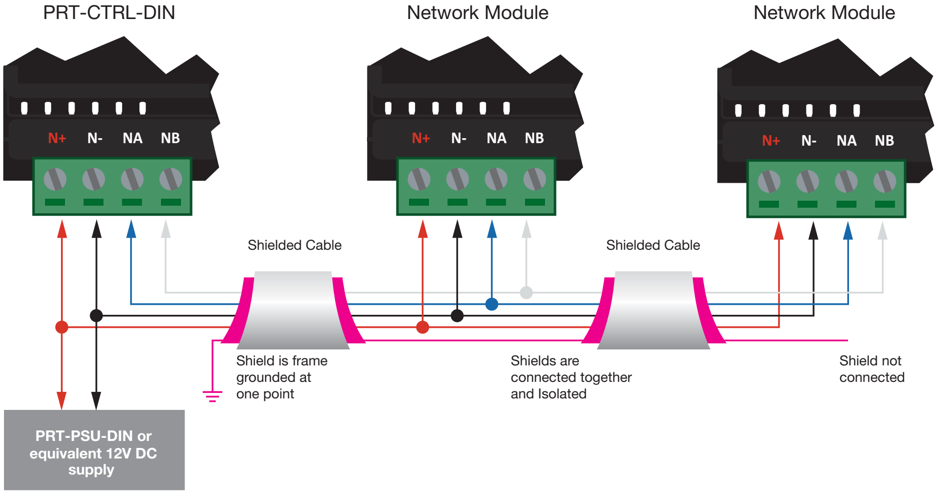


Warning: When using multiple power supplies it is important to ensure that all ground connections (V-) are connected between all power supplies and that no power connections (V+) are connected between any power supplies.

Encrypted Module Network

The Protege system incorporates encrypted RS-485 communications technology. Always connect the NA and NB terminals of the controller to the NA and NB terminals of the expansion devices and keypads. The N+ and N- must connect to a 12V power supply source capable of supplying the peak current drawn by all modules.

If a shielded cable is used, the shield must be connected at only one end of the cable. DO NOT connect a shield at both ends.


PRT-CTRL-DIN
Network Module
Network Module
N+
N-
NA
NB
Shielded Cable
Shielded Cable
Shield is frame grounded at one point
Shields are connected together and Isolated
Shield not connected
PRT-PSU-DIN or equivalent 12V DC supply

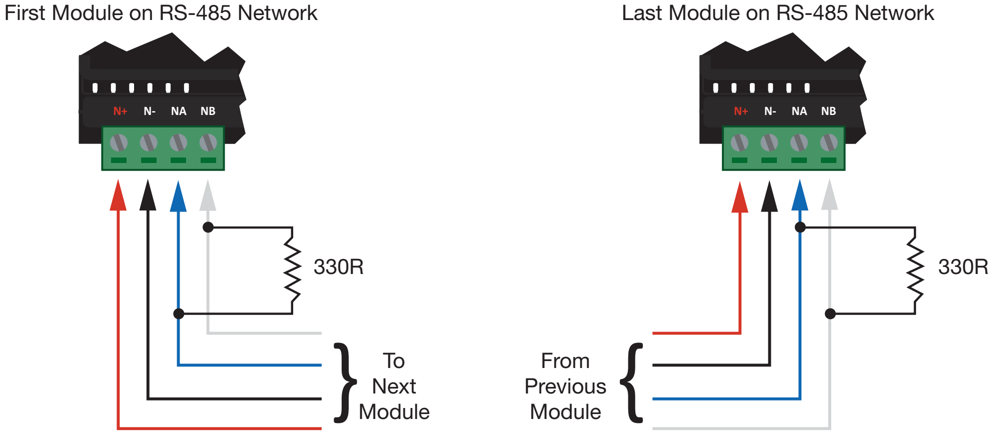
Warning: The 12V N+ and N- communication input must be supplied from only one point. Connections from more than one 12V supply may cause failure or damage to the units supplying power. Make sure that the power supply can supply enough current for the peak load drawn by all modules connected to the 12V supply, including the Controller itself.

The recommended module network wiring specifications are:

- Belden 9842 or equivalent
- 24AWG twisted pair with characteristic impedance of 120ohm
- Maximum total length of cable is max 900m (3000ft)
- CAT5e / CAT6 are also supported for data transmission when using ground in the same cable (to a maximum length 100m / 328ft)

Unused wires in the cable must not be used to carry power to other devices.

The 330 Ohm EOL (End of Line) resistor provided **must** be inserted between the NA and NB terminals of the first and last modules on the RS-485 network. These are the modules physically located at the ends of the RS-485 network cabling.



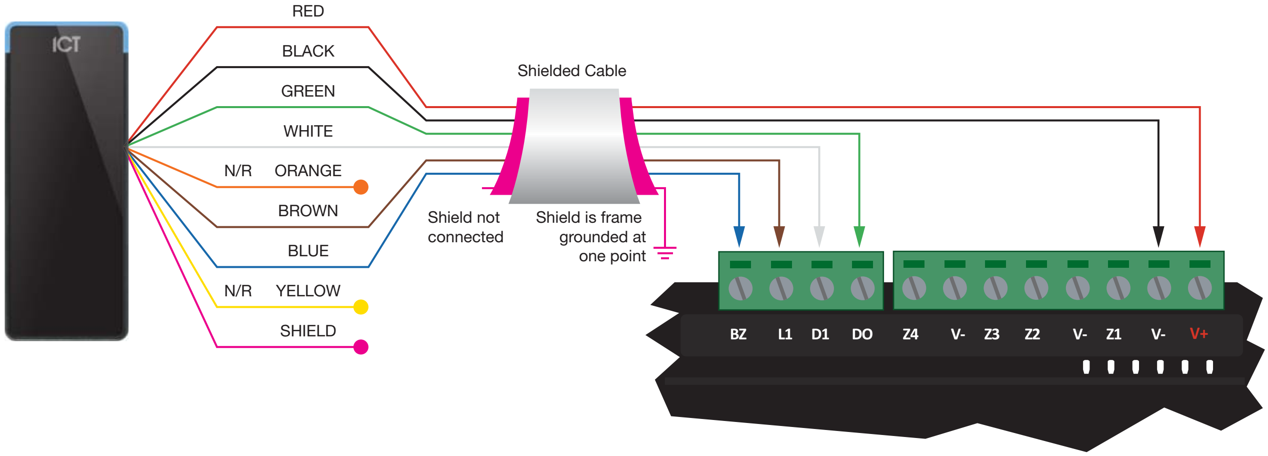
Card Reader Connection

Both the Protege DIN Rail Controller and RDM2 provide access control functionality allowing the connection of 2 Wiegand devices to control 2 doors (entry or exit only) or they can be configured in multiplex mode to allow 4 Wiegand devices controlling 2 doors giving the flexibility of entry and exit readers without the need for additional hardware.

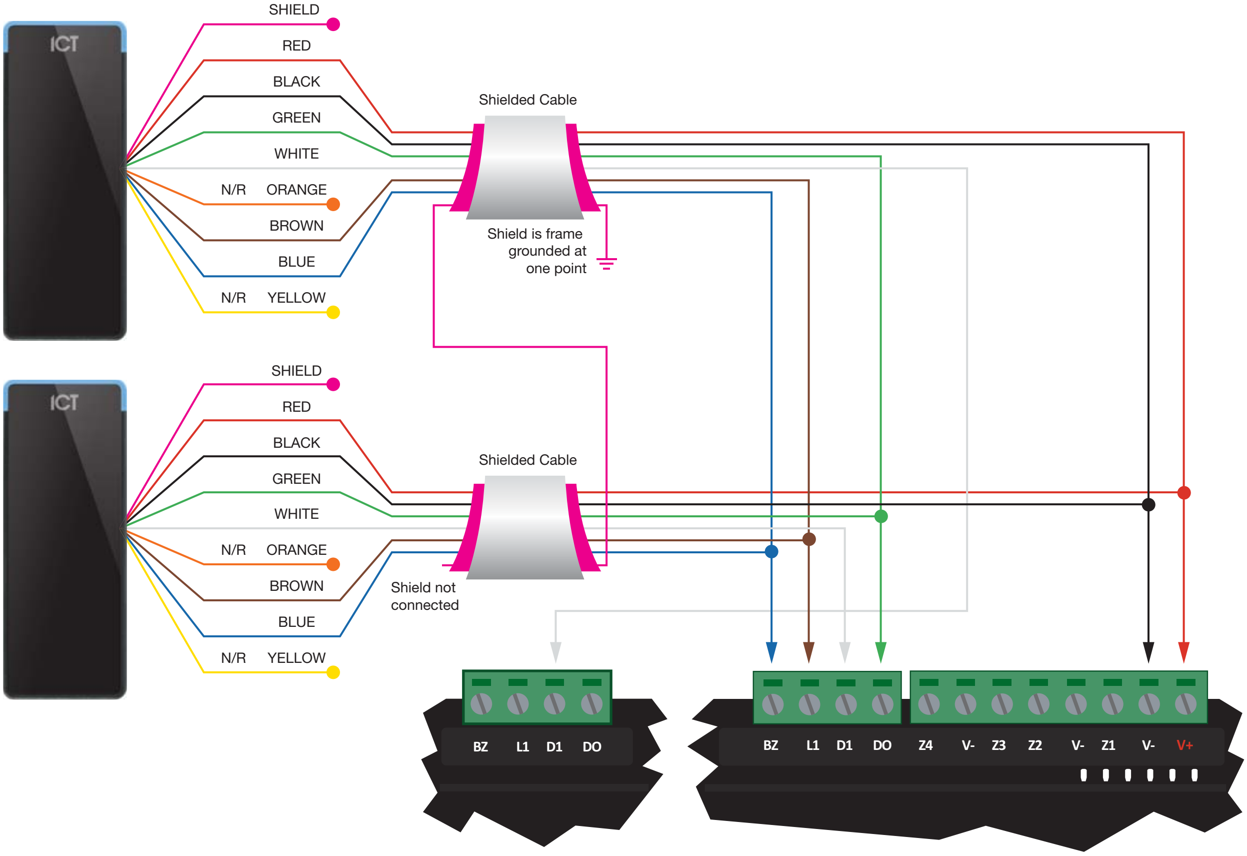
- The card reader must be connected to the Controller port using a shielded cable
- Always refer to the card reader manufacturer for detailed installation guidelines
- The shield connection must only be connected at one end of the cable in the metallic enclosure (frame grounded)
- Do not connect the shield to a V- connection on the Controller
- Do not join the shield and black wires at the reading device
- Do not connect the shield to any shield used for isolated communication

All Protege Readers are now shipped with single LED mode set as default.

The following diagram shows the connection of a standard Wiegand reader with the controller or RDM2 controlling an access door in entry or exit mode (2 doors, 2 readers).

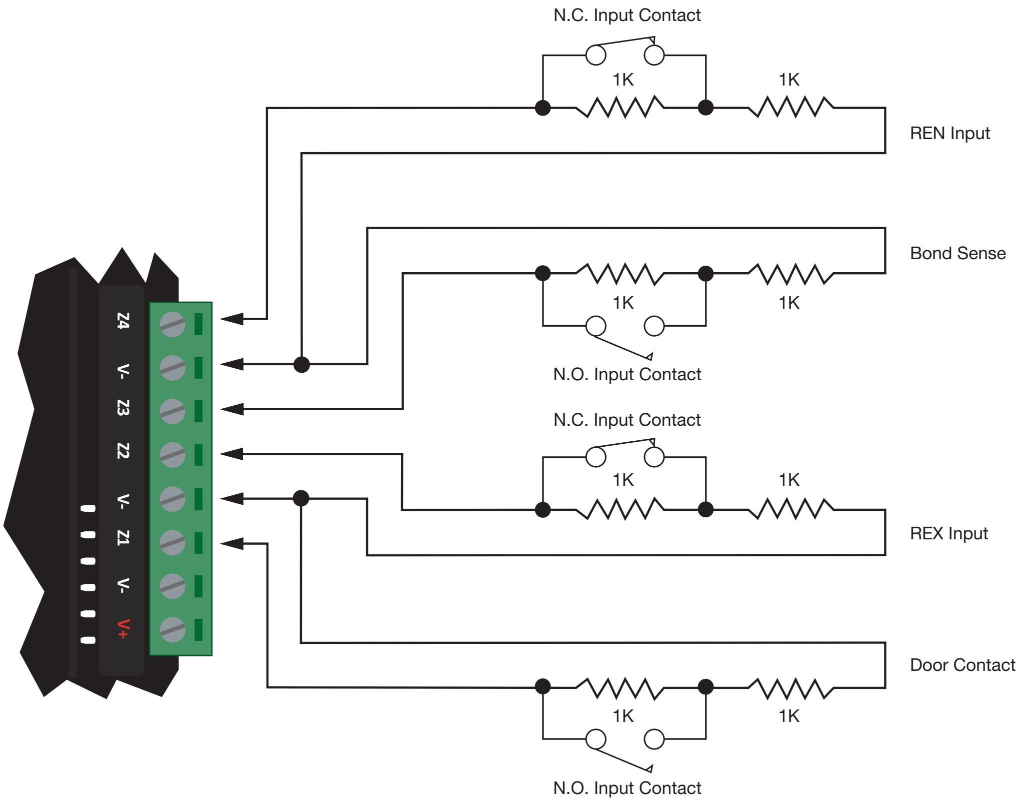


When operating in multiple reader mode, the Controller or RDM2 allows the connection of 4 Wiegand reading devices controlling two doors each with entry/exit readers. The secondary reader will have all connections wired to the same port as the primary card reader with the DATA 1 connection wired to the opposite reader connection DATA 1 input.



Input Connection

The Protege DIN Rail Controller and RDM2 both allow the connection of up to 4 contacts for monitoring and controlling access control doors. Each input on the Controller can be used for the door function that is automatically assigned and as a normal input on the system. The following example shows the connection of a normally closed door position monitoring contact to monitor the Open, Closed, Forced and Alarm conditions of the door.



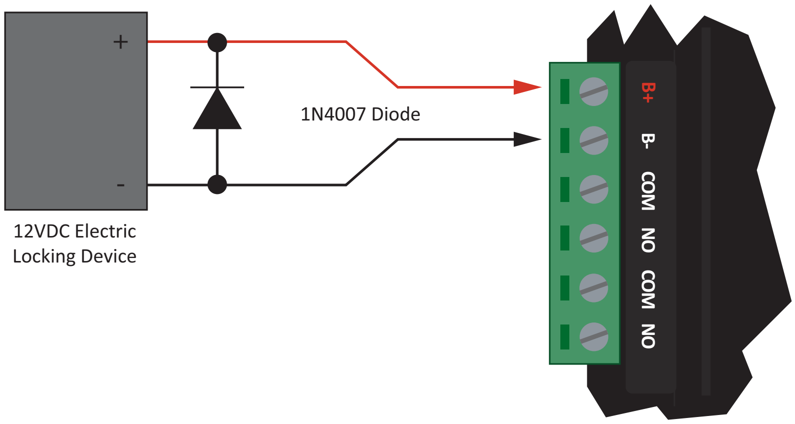
Inputs 1-4 and 5-8 can operate as either general purpose inputs or as onboard reader inputs. If used as general purpose inputs, make sure that these inputs are not defined in the onboard reader set up.

Input	Access Control Function	Default Setting
Input 1	Door Contact, Port 1	Door Contact, Port 1
Input 2	REX Input, Port 1	REX Input, Port 1
Input 3	Bond Sense, Port 1	General Purpose Input
Input 4	REN Input, Port 1	General Purpose Input
Input 5	Door Contact, Port 2	Door Contact, Port 2
Input 6	REX Input, Port 2	REX Input, Port 2
Input 7	Bond Sense, Port 2	General Purpose Input
Input 8	REN Input, Port 2	General Purpose Input

When connected, the REX Input can be programmed to operate regardless of the door contact state. The REX input can also be programmed to recycle the door alarm time to prevent nuisance alarms when the door is held open to permit longer entry.

Lock Connection

The DIN Rail Controller provides a connection for an electric strike lock with full monitoring of the lock circuit for tamper and over current/fuse blown conditions. The door lock monitoring can be disabled if it is not required.

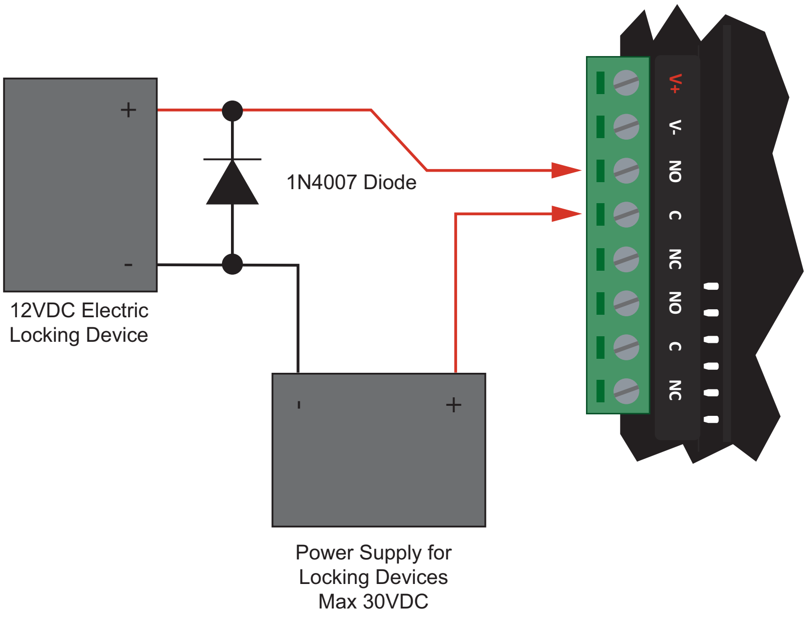


The lock output is shared with the bell/siren function. You can select another output for the lock control if the bell/siren function is required. To use the lock outputs in conjunction with the onboard reader module, the Lock output for the door associated with the reader port must be configured to be the desired lock output on the controller. This is not configured by default.

When using a door with an Entry and Exit Reader, the lock output should be connected to the Bell (CP001:01), and the swap lock option for the second reader input should be enabled to allow the reader LEDs to display the correct status.

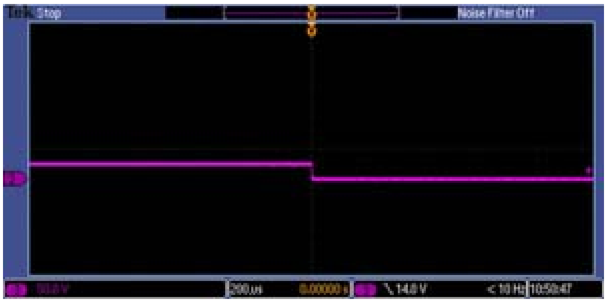
Note: The Bell output current must not exceed 1.1A or electronic shutdown will be engaged.

The DIN Rail Controller and RDM2 provide 2 lock output relays that can be used to switch electric locks

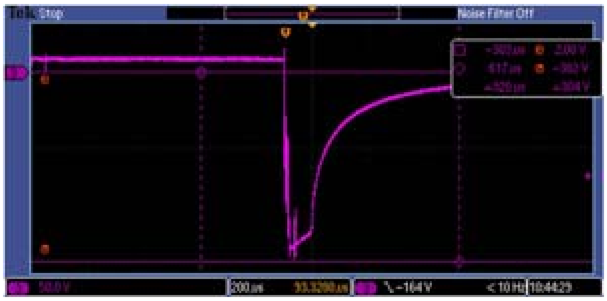

+
-
1N4007 Diode
12VDC Electric Locking Device
-
+
Power Supply for Locking Devices Max 30VDC
V+
V-
NO
C
NC
NO
C
NC

- When using a door with an entry and exit reader, the LOCK output should be connected to LOCK 1, and enable the swap lock option for the second reader input to allow the reader LED's to display the correct status
- The 1N4007 diode is supplied with the product and **must** be installed at the electric strike terminals

Electromagnetic spikes can affect normal system operation and in some cases, damage hardware. You **must** use a diode every time a coil, lock, or relay, is controlled.



Waveform **with** a diode



Waveform **without** a diode

When the lock is de-energized from 24VDC, the diode absorbs the "Inductive-Kick". All the energy that the locks coil has to "free" is absorbed by the diode. When the lock is de-energized from 24VDC, there is no diode to absorb all the energy that the coil has accumulated. This energy has to go somewhere, in this case, there is no diode to absorb the energy, so it goes in the cable. Note that voltage goes as low -300VDC. These high spikes can cause electromagnetic disruptions and may affect the normal operation of the system. Even worse, it may damage equipment that is not protected by a diode.

Inputs

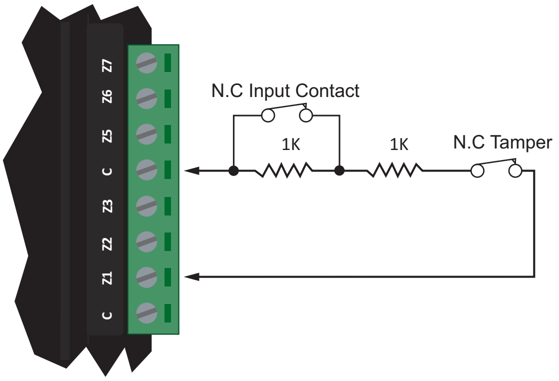
The PRT-ZX16-DIN has 16 inputs that it monitors the state of using EOL monitored or dry contact devices such as magnetic switches, PIR motion detectors and temperature thermostats. It also monitors up to 16 trouble inputs used to report trouble conditions such as module communication problems.

The DIN Rail Controller has 8 onboard inputs and monitors up to 64 trouble inputs. Trouble inputs will open or go in to alarm when the trouble condition is present, and close or return to normal when the trouble condition is restored. The Controller can monitor and control thousands of additional inputs and trouble inputs by using the expansion modules.

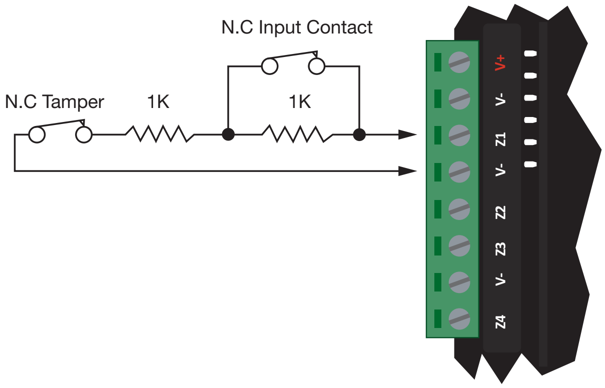
Devices connected to these inputs can be installed to a maximum distance of 300m (1000ft) from the ZX16 or Controller when using 22 AWG wire. Each zone input may be individually configured for normally opened and normally closed configurations with or without EOL resistors for tamper and short condition monitoring.

When using an input with the EOL resistor configuration, the controller generates an alarm condition when the state of a zone changes between open and closed and generates a tamper alarm condition when a wire fault (short circuit) or a cut wire (tampered) in the line occurs.

Inputs default to require the EOL resistor configuration.



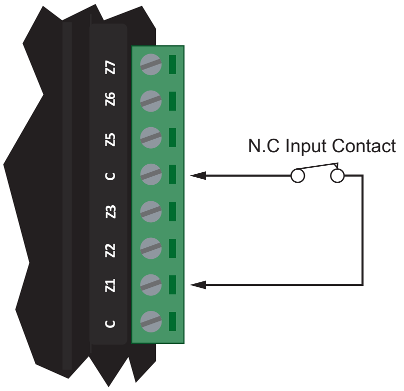
ZX16 with EOL Resistor Configuration



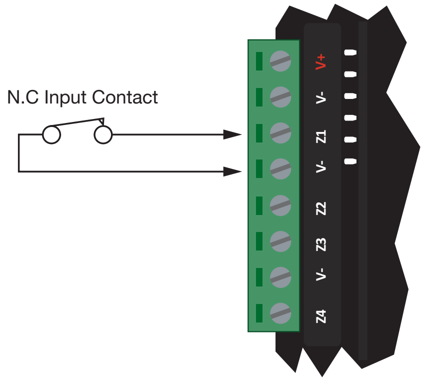
Controller with EOL Resistor Configuration

Each input can use a different configuration. To program a large number of inputs with a certain configuration, use the multi-select feature within the Protege GX software.

When using the No Resistor configuration, the controller only monitors the opened and closed state of the connected input device generating the alarm and seal conditions.



ZX16 with No EOL Resistor Configuration



Controller with No EOL Resistor Configuration

When using the EOL resistor configuration, the EOL resistor option must be configured based on the site requirements. Note these resistor options are supported on the PRT-CTRL-DIN Controller but not all resistor options are supported on all Protege field modules.

Value 1	Value 2	Monitored Status
1k	1k	Open, Closed, Tamper, Short
1k	-	Open, Closed
<5K7	-	Open, Closed
No Resistors	-	Open, Closed
2k2	6k8	Open, Closed, Tamper, Short
10k	10k	Open, Closed, Tamper, Short
2k2	2k2	Open, Closed, Tamper, Short
4k7	2k2	Open, Closed, Tamper, Short
4k7	4k7	Open, Closed, Tamper, Short

Both the Controller and RDM2 have 8 inputs onboard. These inputs are assigned default functionality if used for access control. The default settings are shown in the following table:

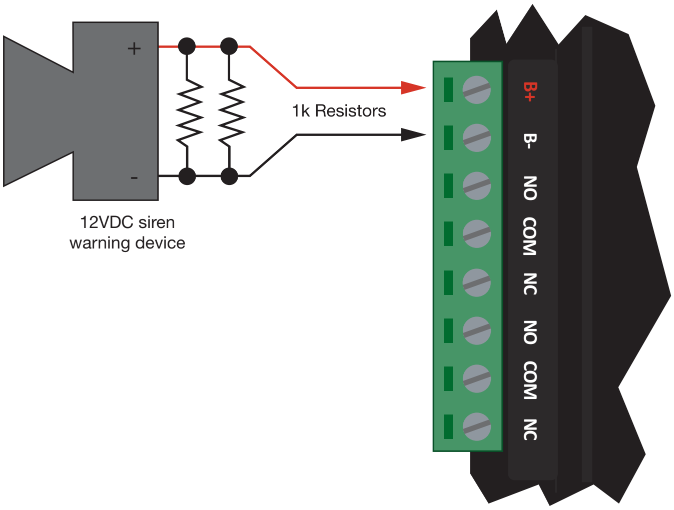
Input	Access Control Function	Default Setting
Input 1	Door Contact, Port 1	Door Contact, Port 1
Input 2	REX Input, Port 1	REX Input, Port 1
Input 3	Bond Sense, Port 1	General Purpose Input
Input 4	REN Input, Port 1	General Purpose Input
Input 5	Door Contact, Port 2	Door Contact, Port 2
Input 6	REX Input, Port 2	REX Input, Port 2
Input 7	Bond Sense, Port 2	General Purpose Input
Input 8	REN Input, Port 2	General Purpose Input

Any of these inputs that are not configured for use with the onboard reader may be used as general purpose inputs. If the onboard reader is enabled and you wish to use some of these as general inputs, you will need to disable the associated function input in the Reader Expander programming section of the Protege GX software.

Outputs

The Controller has 7 onboard outputs. Outputs are used to activate sirens, bells, warning devices, control lighting and doors. The first output on the Controller has a special hardware design that allows it to monitor for fault conditions and is ideally suited to driving sirens or warning devices.

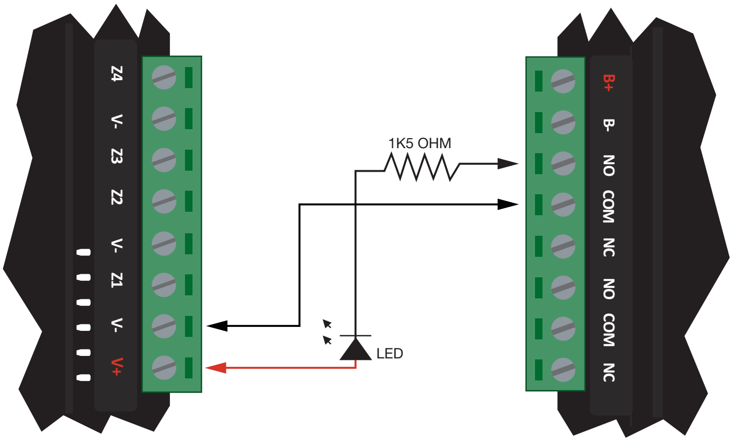
The + and - terminals of the Bell output (CP001:01) are used to power bells, sirens or any devices that require a steady voltage output. The bell output supplies 12VDC upon alarm and supports one 30-watt siren. The bell output uses an electronically fused circuit and automatically shuts down under fault conditions.



If the load on the bell terminals returns to normal, the controller reinstates power to the bell terminals on the next transition of the output.

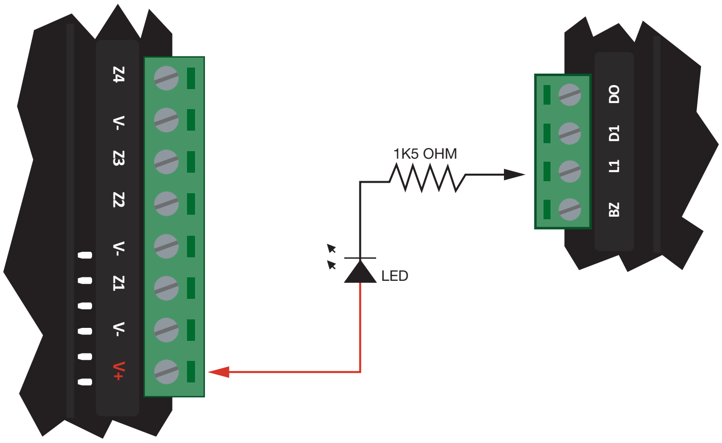
When the bell output is not used, the appropriate trouble input will be activated. This can be avoided by connecting a 1K resistor (provided in the accessory bag) across the bell output. If the bell is not being used for another function, and the trouble input is not programmed in the system, a resistor is not required. Connecting a Piezo siren may result in a dull noise being emitted. This is caused by residual current from the monitoring circuit. To prevent this occurring, connect 2 1K resistors in parallel.

The Relay Outputs (CP001:03 and CP001:04) on the controller are normally open relay outputs. These outputs can be used to activate larger relays, sounders and lights, etc.



Warning: The Relay outputs can switch to a maximum capacity of 7A. Exceeding this amount will damage the output.

If readers are not attached to the reader ports then the Reader 1 L1 and BZ, and the Reader 2 L1 and BZ outputs can be used as general purpose outputs. These can be controlled by assigning the RDxxxGreen R1, RDxxx Beeper R1, RDxxxGreen R2 and RDxxx Beeper R2 outputs of whichever reader module has been configured as the onboard reader module. These are open drain outputs which switch to the V- reference.



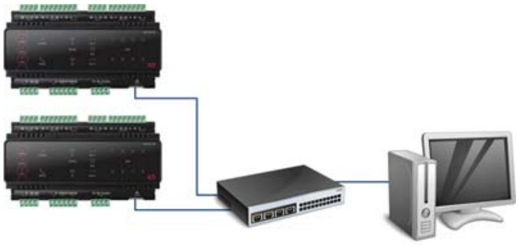
Warning: The reader outputs can switch to a maximum capacity of 50mA. Exceeding this amount will damage the output.

Ethernet 10/100 Network Interface

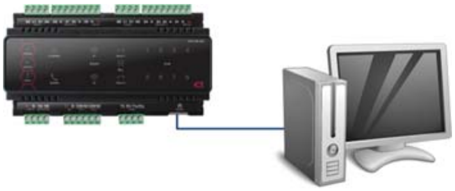
The communication between the Protege System and the Protege Controller uses a 10/100 Ethernet network operating the TCP/IP protocol suite. The IP address of the Controller can be configured using the LCD Keypad terminal or via the built in web interface. The default IP address is set to a static IP address of 192.168.1.2 with a subnet mask of 255.255.255.0. These IP address settings are commonly used for internal networks.

Installing the Controller on an active network requires knowledge of the configuration and structure for the network. Always consult the network or system administrator and ask them to provide you with a fixed IP address that can be assigned to the Controller.

When installing an Ethernet connection the Controller should be interfaced using a standard segment (<100m in length) and should be connected to a suitable Ethernet hub or switch.

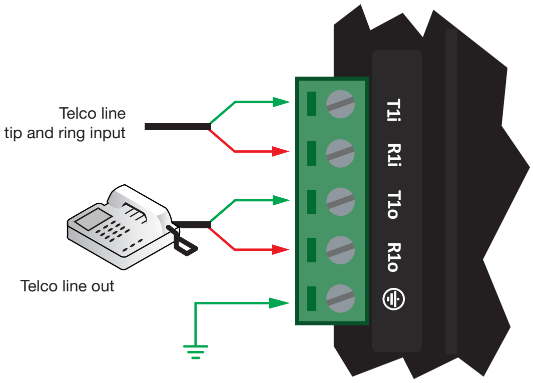


Temporary direct connections can be used for onsite programming by connecting directly to the computer Ethernet port.



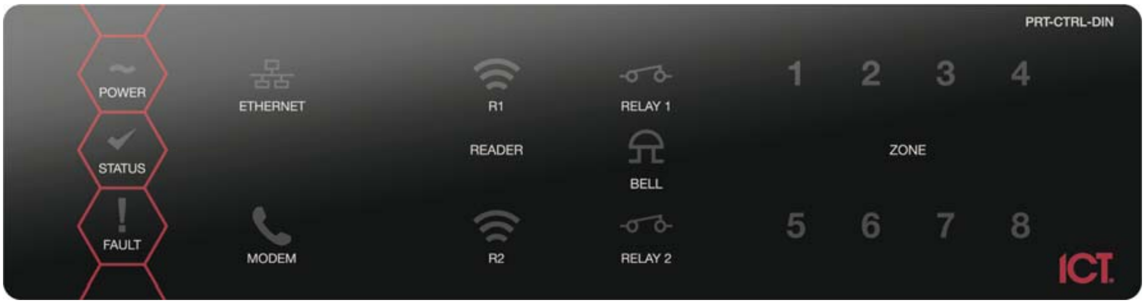
Telephone Dialer

The Protege DIN Rail Controller provides the ability to communicate alarms and upload information to remote systems using the onboard 2400bps modem. The telephone line can be connected directly to the Controller using the onboard telephone connection terminals.



LED Indicators

All Protege DIN Rail hardware includes comprehensive front panel diagnostic indicators that can aid the installer in diagnosing faults and conditions. In some cases an indicator may have multiple meanings depending on the status indicator display at the time.



Status Indicator

The Status indicator displays module status of the module.

State		Description
✓ ✓ ✓	Continuous fast flash	Module attempting registration with controller
✓ ✓ ✓	Continuous slow flash	Module successfully registered with controller
✓	Single flash	Module communications activity

ℹ When the fault and status indicators are flashing alternately, the module is in the identification mode, enabling the installer to easily identify the module in question. Upon either a module update or the identification time period set expiring, the module will return to normal operation.

Fault Indicator

The Fault indicator is lit any time the module is operating in a non-standard mode.

State		Description
! ! !	Continuous slow flash (red)	Module is in boot mode awaiting firmware update
!	Constantly on (red)	Module is in error state and will flash an error code with the status indicator. Refer to the Error Code Display section to determine the error.

ℹ When the fault indicator is on, the status indicator will show an error code. Refer to the Error Code Display section for more information.

Error Code Display

The following table is only valid if the FAULT indicator is CONSTANTLY ON and the STATUS indicator is FLASHING RED.

If the fault indicator is FLASHING the module requires a firmware update or is currently in firmware update mode.

The status indicator will FLASH RED with the error code number. The error code number is shown with a 250ms ON and OFF period (duty cycle) with a delay of 1.5 seconds between each display cycle.

Flash	Error Description
1	Unknown Error Code The error code returned by the system controller could not be understood by the module. Contact Integrated Control Technology.
2	Firmware Version The firmware version on the module is not compatible with the system controller. To clear this error, update the module using the module update application.
3	Address Too High The module address is above the maximum number available on the system controller. To clear this error change the address to one within the range set on the system controller, restart the module by disconnecting the power.
4	Address In Use The Address is already in use by another module. To clear this error set the address to one that is not currently occupied. Use the view network status command to list the attached devices, or the network update command to refresh the registered device list.
5	Controller Secured Registration Not Allowed Controller is not accepting any module registrations. To allow module registrations use the network secure command to change the secure setting to not secured.
6	Serial Number Fault The serial number in the device is not valid. Return the unit to the distributor for replacement.
7	Locked Device The module or system controller is a locked device and cannot communicate on the network. Return the unit to the distributor for replacement.

Power Indicator

The Power indicator is lit whenever the correct module input voltage is applied.

State		Description
~	On	Correct module input voltage applied
~	Off	Incorrect module input voltage applied

Relay Indicators

The Relay 1 and Relay 2 indicators show the status of the lock output relay.

State		Description
	On (red)	Relay output is ON
	Off	Relay output is OFF

Zone (Input) Indicators

Whenever an input on the Controller is programmed with an input type and area, the input status is displayed on the front panel (indicators 1-8) corresponding to the physical input number (Z1-Z8). This allows easy walk test verification of inputs without the need to view the inputs from the keypad or Protege interface.

State		Description
1	Off	Input is not programmed
1	On (red)	Input is in an OPEN state
1	On (green)	Input is in a CLOSED state
1 1 1	Flashing (red)	Input is in a TAMPER state
1 1 1	Flashing (green)	Input is in a SHORT state

Reader Data Indicators

The R1 and R2 indicators display the status of the data being received by the onboard readers.

State		Description
📶	Short (red) flash	A SHORT flash (<250 Milliseconds) will show that data was received but was not in the correct format.
📶	Long (red) flash	A LONG flash (>1 Second) indicates that the unit has read the data and the format was correct.

PSU Indicators

V1 Output/V2 Output Indicators

The V1 Output and V2 Output indicators will show the status of the 12VDC output.

State		Description
~	Constantly on (green)	12VDC output operating OK
~	Continuous flash	12VDC output failure

Battery Indicator

The Battery indicator will show the status of the backup battery.

State		Description
🔋	Continuous flash (red)	Backup battery is disconnected
🔋	Constantly on (red)	Backup battery failed its dynamic battery test
🔋	Constantly on (green)	Last backup battery dynamic test successful

Temp Indicator

The Temp indicator will show the status of the unit's core temperature.

State		Description
🌡	Constantly on (red)	Core temperature exceeded. Over Temp Shutdown Activated
🌡	Continuous flash (red)	Core temperature within 10°C of Over Temp Shutdown
🌡	Constantly on (green)	Core temperature OK

Core Temperature on Output Load Operation

In addition to the comprehensive front panel diagnostic indicators, the following table illustrates how the core temperature of the Power Supply will influence the operation of the V1 and V2 Outputs.

	Core Temperature		
Output Load Operation Status	< 70°C	70°C ~ 80°C	> 80°C
Outputs Enabled (Mains Power)	✓	✓	
Outputs Supplied by Battery	✓	✓	✓
Output Over-Current Failure Trouble Input Activated		✓	✓
Over-Current Output Shutdown Activated			✓

Output Current Indicator

The Output Current indicator will show the status of the output current for both V1+ and V2+.

State		Description
■ ■ ■ ■ ■ ■ 🟥	Constantly on	Output current exceeded. **Over Current Shutdown Activated**
🟩 🟩 🟩 🟩 🟩 🟩 🟥	Continuous flash	Output current exceeded maximum, approaching Over Current Shutdown
🟩 🟩 🟩 🟩 🟩 🟩 🟩	Constantly on (all indicators)	Maximum output current level reached
🟩 🟩 🟩 🟩 🟩 ■ ■	Constantly on (partial)	Indicated output current level reached

Output Current Influence on Output Load Operation

In addition to the comprehensive front panel diagnostic indicators, the following table illustrates how the total output current drawn from the Power Supply will influence the operation of the V1 and V2 Outputs.

	Output Load Current		
Output Load Operation Status	0 ~ 4.0A	4.0 ~ 5A	5A ~ Short Circuit
Outputs Enabled (Mains Power)	✓	✓	
Outputs Supplied by Battery	✓	✓	
Output Over-Current Failure Trouble Input Activated		✓	✓
Over-Current Output Shutdown Activated			✓

Controller Indicators

Ethernet Link Indicator

The Ethernet indicator shows the status of the Ethernet connection.

State		Description
🖧	On (green)	Valid link with a hub, switch or direct connection to a personal computer detected
🖧 🖧 🖧	Flashing (green)	Data is being received or transmitted
🖧	Off	Ethernet cable not connected, no link detected

Modem Indicator

The Modem indicator shows the status of the onboard modem.

State		Description
☎	On (green)	Modem has control of telephone line
☎	Off	Modem is not active

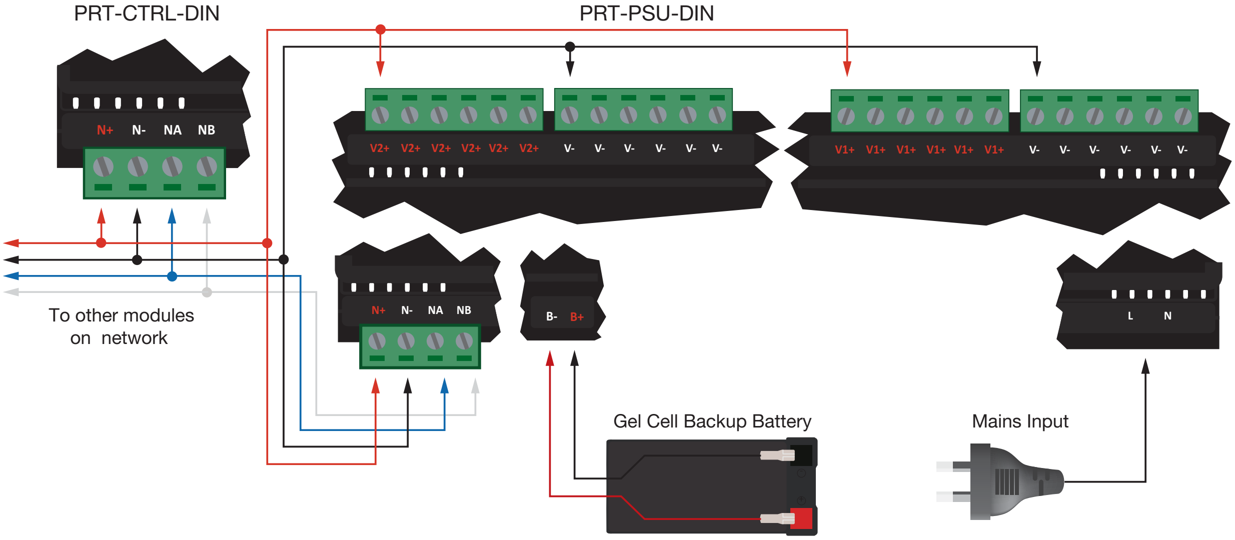
Bell Indicator

The Bell indicator shows the status of the bell output and the over current or circuit fault conditions.

State		Description
🔔	Off	Bell is connected, output is OFF
🔔	On (green)	Bell is ON
🔔	Single (green) flash	Bell is ON, the circuit is in over current protection
🔔 🔔	Two (green) flashes	Bell is OFF, the circuit to the siren/bell is cut, damaged or tampered

Review Questions

In the configuration shown, what is the maximum continuous load that can be drawn by the module network?



PRT-CTRL-DIN
PRT-PSU-DIN
N+ N- NA NB
V2+ V2+ V2+ V2+ V2+ V2+ V- V- V- V- V- V-
V1+ V1+ V1+ V1+ V1+ V1+ V- V- V- V- V- V-
To other modules on network
N+ N- NA NB
B- B+
L N
Gel Cell Backup Battery
Mains Input

□ 4 Amps

□ 10 Amps

□ 3.3 Amps

□ 3 Amps

To monitor a cabinet tamper switch using a dedicated tamper input, which module is required?

□ PRT-PSU-DIN Power Supply

□ PRT-CTRL-DIN Controller

□ PRT-ZX16-DIN Zone Expander

□ PRT-RDM2-DIN Reader Expander

Where and when should a diode be fitted?

□ Across the coil when a coil is being controlled

□ Across the lock when a lock is being controlled

□ Across the relay when a relay is being controlled

□ All of the above

Where does the shield of the cable connected to a reader get connected?

□ Frame grounded at one point. Connected to the reader shield.

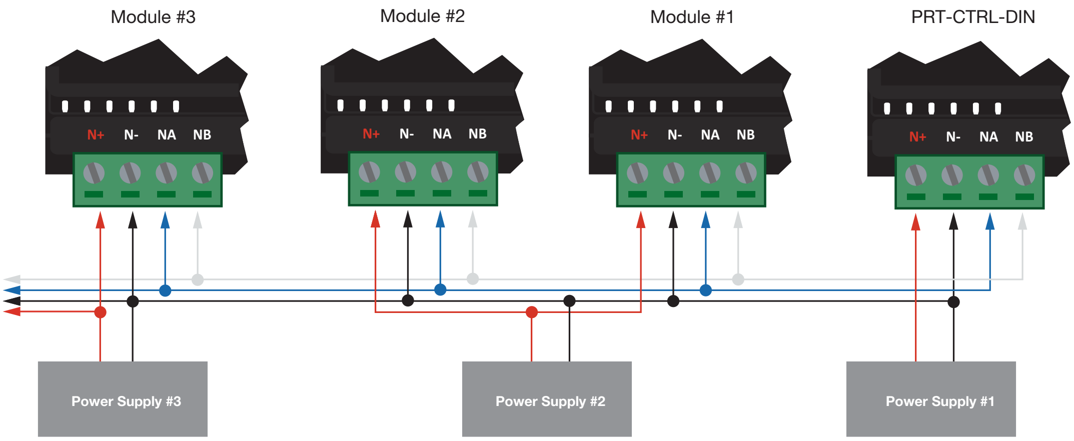
□ Wired to V- at the Reader Expander. Connected to the reader shield.

□ Card reader cable is not shielded.

□ Frame grounded at one point. Not connected to the reader shield.

Is the wiring method shown in this diagram acceptable?

Assume the power supplies indicated in the diagram shown are DIN Rail PSU's. Is this an acceptable wiring method? If so, what is the maximum **recommended** average current that the Controller could draw?



□ This is an unacceptable wiring method

□ Acceptable, 3 Amps

□ Acceptable, 9 Amps

□ Acceptable, 4 Amps

What does a constant red fault indicator mean?

□ The Module is in identification mode

□ Module communications activity

□ The module is in error state. The status light will flash an error code.

□ The module is in boot mode awaiting firmware

What does a continuous fast green flash of the status indicator mean?

□ The Module is in identification mode

□ There is Module communications activity

□ The Module is online

□ The Module is attempting to register with a Controller

The Bell indicator on a DIN Controller is flashing two green flashes.   What does this mean?

- □ The Bell output is off. The circuit to the bell is ok.
- □ The Bell output is off. The circuit to the siren / bell is cut, damaged or tampered.
- □ The Bell output is on. The circuit to the bell is ok.
- □ The Bell output is on. The circuit is in over current protection.

What does a flashing green indicator on an input mean?

- □ The input is in an open state
- □ The input is in a closed state
- □ The input is in a tamper state
- □ The input is in a short state

Module 130: Protege GX Hardware Setup

This module outlines the requirements for setting up and bringing a Controller online.

In This Module

DIN Rail Controller Setup

To bring a DIN Rail Controller online with your Protege GX Server, the appropriate IP address, subnet mask and gateway (if applicable) must be assigned.

The DIN Rail Controller has a factory default IP address of 192.168.1.2 and this should be changed to suit the IP addressing scheme of your site. The IP address can be changed using the built in web interface, or from a keypad.

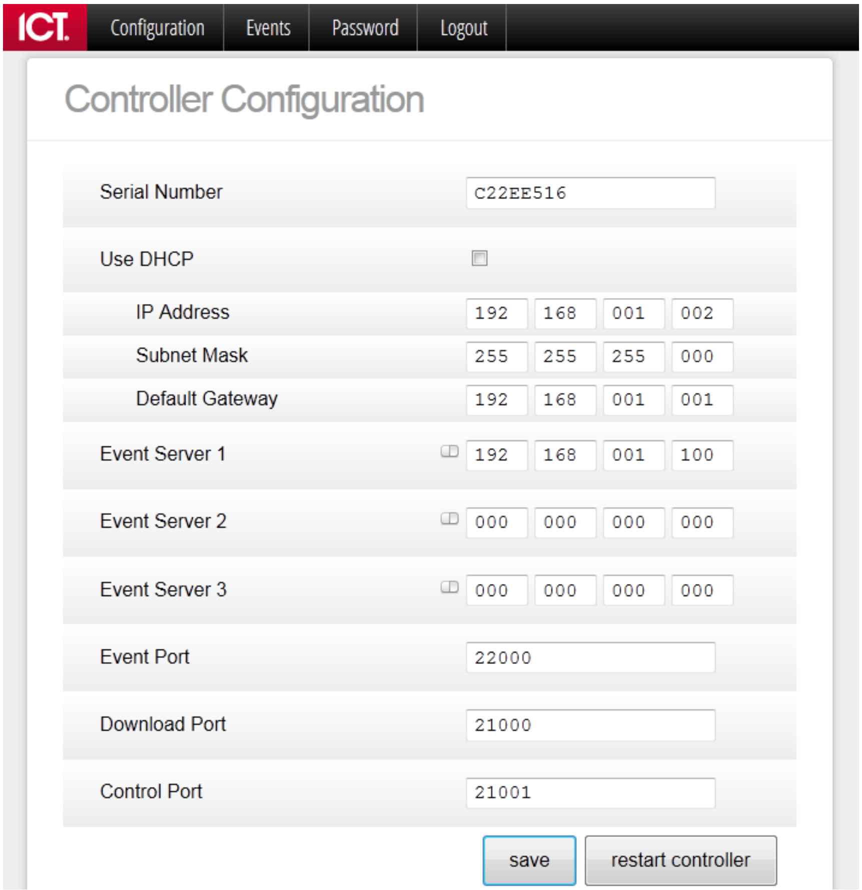
Assigning the IP Address via the Web Interface

If the current IP is known, the recommended method is to connect to the built in web interface to edit the settings.

1. With the Controller connected to your network, type the current IP address into the address bar of your web browser. The default IP address is 192.168.1.2.
2. A login screen appears. Enter the user name and password:

   The default user name is **admin**.

   The default password is **admin**.
3. The Controller Configuration screen is displayed:



Controller Configuration

Serial Number	C22EE516
Use DHCP	□
IP Address	192 168 001 002
Subnet Mask	255 255 255 000
Default Gateway	192 168 001 001
Event Server 1	192 168 001 100
Event Server 2	000 000 000 000
Event Server 3	000 000 000 000
Event Port	22000
Download Port	21000
Control Port	21001

4. Enter the required settings, and click **Save**.
5. Restart the Controller.

Assigning the IP Address from a Keypad

If the current IP address of the Controller is not known, it can be viewed and/or changed using a PRT-KLCD keypad.

1. Connect the keypad to the module network.
2. Log in to the keypad using any valid Installer code. The default Installer code is 000000.

   If the default code has been overridden and you do not know the new codes, you will need to force the Controller into its default state. This is achieved by connecting Reader 2 D0 to Reader 2 L and power cycling the unit. Note that this will erase **all** existing programming as well as setting up the default Installer code.

3. Once logged in press **[Menu] [4] [2] [1]** to display the current IP address

   ```
   *Main Menu*
   4. Install
   ```

   ```
   *Install Menu*
   2. IP config
   ```

   ```
   *IP Menu*
   1. View/Edit IP
   ```

4. Edit the address using the numeric and **[LEFT] [RIGHT]** keys

   ```
   IP Address
   192.168.001.002
   ```

   ```
   IP Address
   192.168.001.003
   ```

5. Press the **[ARM]** key to save your changes

   ```
   Press [ENTER]
   to acknowledge
   ```

6. You'll be prompted to confirm your changes. Press the **[ENTER]** key to acknowledge. If you press any other key, your changes will be discarded.
7. Go back to the View/Edit IP menu by pressing **[ENTER]** or **[1]**. Press the **[UP]** key to change the subnet mask (if required).

   ```
   Net Mask
   255.255.255.000
   ```

   By default, the PCB Controller comes with a 24 bit class C subnet mask already set.

8. Press the **[UP]** key again, to display the Gateway address.

   ```
   Gateway
   192.168.001.001
   ```

   This should be changed if your server is not on the same subnet, or if you are using an NTP server on another subnet, and should be set to the IP address of your network's router.

Once finished, you must restart the Controller for the changes to take effect.

Restarting the Controller

There are three methods to restart the Controller:

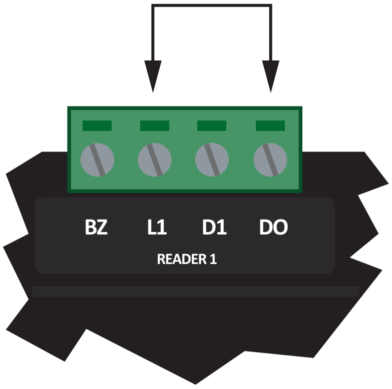
1. Cycling the power
2. Using the web interface and clicking the **Restart** link
3. Using the keypad and selecting **[Menu] [4] [2] [2]**

Setting the Controller to use a Known IP Address

If the current IP address is **not** known, it can be temporarily defaulted to 192.168.111.222. This resets the IP address for as long as power is applied but will **not** save the change permanently. Once the link is removed and power is cycled to the unit, the previously configured IP address is used again. This means that if the currently configured IP address is unknown, you are able to connect to the web interface to view and/or change it.

1. Remove power from the Controller by disconnecting the 12V DC input.
2. Connect a wire link between **Reader 1** D0 input and **Reader 1** L1 output.
3. Power up the Controller.
4. When the Controller starts up it will use the following settings:

   IP address : 192.168.111.222
   Gateway : 192.168.111.254
   Net Mask : 255.255.255.0
   DHCP : disabled
5. Connect to the web interface by typing 192.168.111.222 into the address bar of your web browser, and view or change the IP address as required.



Training Exercise

For the purposes of this training, use either of the previous methods to:

1. Change the **Controller IP address** to 192.168.1.3

   -and-
2. Change the **Event Server IP address** to 192.168.1.100

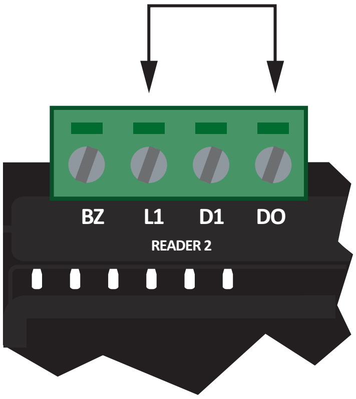
Defaulting the Controller

The Protege DIN Rail Controller can be set back to factory default using the following procedure. This resets all internal data and event information, but does not reset the IP address.

Defaulting the Controller sets the default installer code to 000000 until the new configuration data is downloaded to the Controller

1. To default a controller, remove the power by disconnecting the 12V DC input.
2. Connect a wire link between **Reader 2** D0 input and **Reader 2** L1 output.
3. Power up the Controller.
4. Once the Controller has started and the Status light is flashing, remove the wire link from the Reader 2 connector.

The system will now be defaulted with all programming and settings returned to factory configuration.



PCB Controller Setup

To get a PCB Controller online with your Protege GX Server, there are a number of things that need to be set up.

Firstly, the Controller needs to have an appropriate IP address, subnet mask and gateway (if applicable) assigned. The PCB Controller has a factory default IP address of 192.168.1.2 and this should be changed to suit the IP addressing scheme of your site. The IP address can be changed using the keypad, or using Telnet.

Assigning an IP Address via the Web Interface

If the current IP address is known, use the built in web interface to enter the details. This method can only be used if the IP address is known.

1. With the Controller connected to your network, type the IP address into the address bar of your browser. The default IP address is 192.168.1.2
2. A login screen appears. Enter a valid Installer Code. The default is 000000.
3. Click the Network link. The Network Configuration screen is displayed
4. Enter the required settings, and click **save**.
5. Click the System link. The Controller serial number is shown here. Note this down, as you will need it to connect later.

Once finished, you must restart the Controller for the changes to take effect. This can be done by cycling power to the Controller, using Telnet, or via the keypad.

Assigning an IP Address via the Keypad

1. The Protege GX PCB Controller comes programmed with a default installer PIN of 000000. Login to the system by entering this code into the keypad.

```
ProtegeGX
 By ICT
```

```
Enter user
code: ******
```

```
Good Morning
Installer
```

2. Press [Menu] [4] [2] [1] to display the current IP address

```
*Main Menu*
4. Install
```

```
*Install Menu*
2. IP config
```

```
*IP Menu*
1. View/Edit IP
```

3. Edit the address using the numeric and [LEFT] [RIGHT] keys

```
IP Address
192.168.001.002
```

```
IP Address
192.168.001.003
```

4. Press the [ARM] key to save your changes

```
Press [ENTER]
to acknowledge
```

5. You'll be prompted to confirm your changes. Press the [ENTER] key to acknowledge. If you press any other key, your changes will be discarded.

6. Go back to the View/Edit IP menu by pressing [ENTER] or [1]. Press the [UP] key to change the subnet mask (if required).

```
Net Mask
255.255.255.000
```

By default, the PCB Controller comes with a 24 bit class C subnet mask already set.

7. Press the [UP] key again, to display the Gateway address.

```
Gateway
192.168.001.001
```

This should be changed if your server is not on the same subnet, or if you are using an NTP server on another subnet,and should be set to the IP address of your network's router.

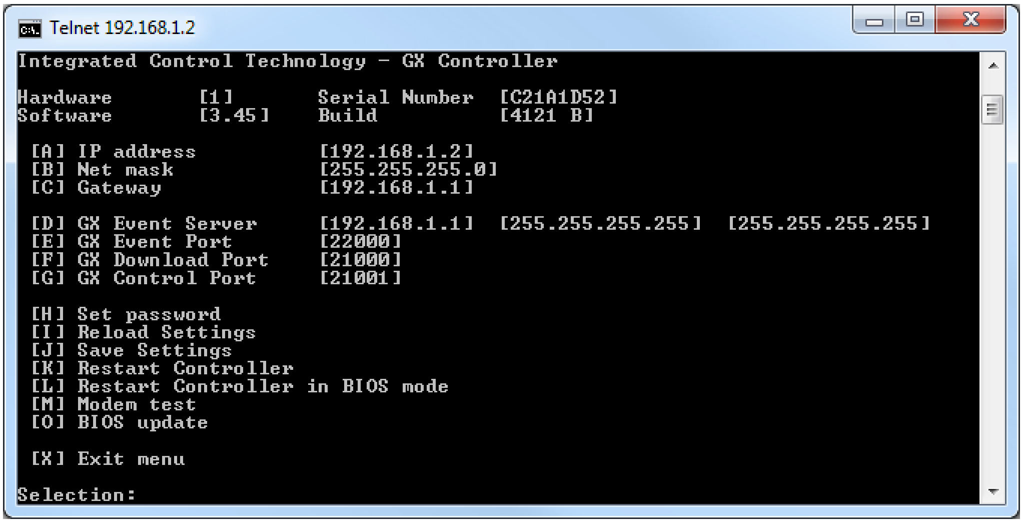
Once finished, you must restart the Controller for the changes to take effect. This can be done by cycling power to the Controller, or using Telnet.

Assigning an IP Address via Telnet

1. Open a command prompt (hold down the Windows key and press [R], then type `cmd` and hit [Enter])
2. Type telnet 192.168.1.2 10001 then press [Enter] followed by the [Esc] key.

   The telnet console displays version information and the serial number of the Controller. Keep a note of the serial number as you will need it later.

3. Enter the default password admin and press [Enter] to display the full Controller menu.



```
Integrated Control Technology - GX Controller

Hardware        [1]        Serial Number   [C21A1D52]
Software        [3.45]     Build           [4121 B]

 [A] IP address            [192.168.1.2]
 [B] Net mask              [255.255.255.0]
 [C] Gateway               [192.168.1.1]

 [D] GX Event Server       [192.168.1.1]  [255.255.255.255]  [255.255.255.255]
 [E] GX Event Port         [22000]
 [F] GX Download Port      [21000]
 [G] GX Control Port       [21001]

 [H] Set password
 [I] Reload Settings
 [J] Save Settings
 [K] Restart Controller
 [L] Restart Controller in BIOS mode
 [M] Modem test
 [O] BIOS update

 [X] Exit menu

Selection:
```

4. Type A and press [Enter] to amend the IP address.
5. Enter the new IP address then press [Enter]
6. Select B if you need to change the subnet mask and C if you need to change the gateway.
7. Save the changes by typing J and pressing [Enter].
8. You must restart the Controller to apply the changes. Type K and press [Enter], type restart when prompted, then press [Enter] again. Alternatively, you can restart by cycling power to the Controller.

If Telnet is Not Recognized

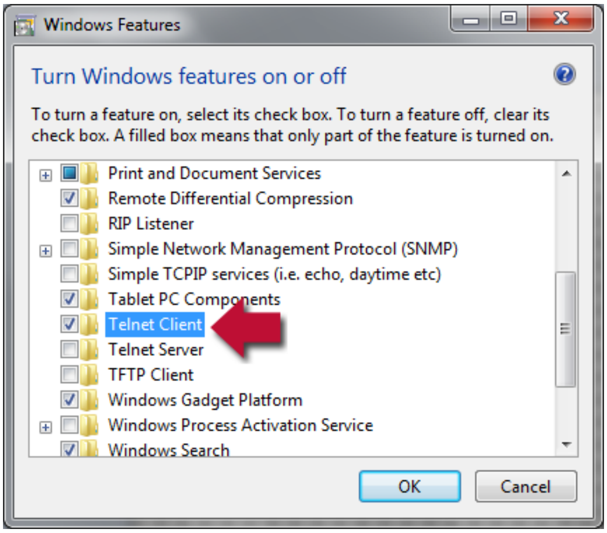
Telnet is included as a standard feature with Windows Vista and Windows 7, however the feature is not installed by default and must be enabled.

If Telnet has not been enabled, you will receive an error:

```
'telnet' is not recognized as an internal or external command, operable program or batch
file
```

To Enable Telnet:

1. From the Windows Start Menu, select Control Panel >Programs > Turn Windows Features On or Off
2. This opens the Windows Features dialog. Scroll down until you see the Telnet Client, select the option then click OK.



Windows Features

Turn Windows features on or off

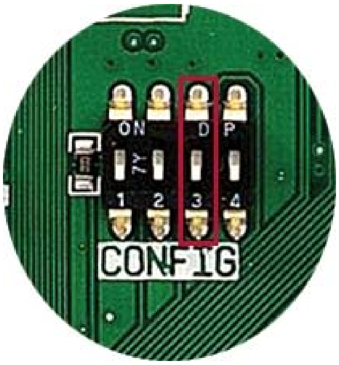
To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

- ■ Print and Document Services
- ☑ Remote Differential Compression
- □ RIP Listener
- □ Simple Network Management Protocol (SNMP)
- □ Simple TCPIP services (i.e. echo, daytime etc)
- ☑ Tablet PC Components
- ☑ Telnet Client
- □ Telnet Server
- □ TFTP Client
- ☑ Windows Gadget Platform
- □ Windows Process Activation Service
- ☑ Windows Search

Once enabled, you will be able to continue with the IP Address Change process. If prompted, restart your computer before continuing.

Setting the Controller to a Temporary IP Address

This method of changing the IP address is used when you do not know the current IP address of the Controller.



1. Turn on DIP switch 3 then cycle the power.

   The Controller will start up with a temporary IP address of 192.168.111.222

2. Change your PC IP address to something on the same subnet (such as 192.168.111.100), then follow the Telnet instructions to change the IP address permanently.

When you have finished, remember to switch DIP switch 3 off again.

Setting the Event Server IP

Once the Controller IP address is set, the Event Server IP address must be set to tell the Controller which IP address to use to send messages to the Event Server.

1. Telnet back into your controller using your new IP address
2. Type **D** and press [Enter]
3. Type **1** to select the first address and press [Enter]. Type in the IP address of your GX Server and press [Enter]

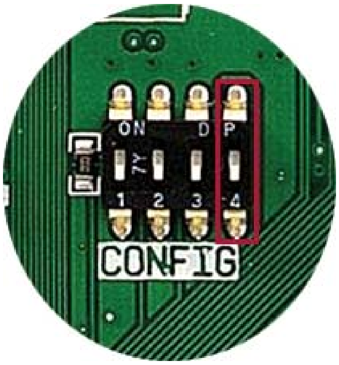
   In most cases, you will only need to set the first IP address. The other two are used only when there are multiple paths to your server. Setup of multiple paths is not covered in this training module.
4. Save the changes by typing **J** and pressing [Enter].
5. You must restart the Controller to apply the changes. Type **K** and press [Enter], type **restart** when prompted, then press [Enter] again. Alternatively, you can restart by cycling power to the Controller.

Defaulting the Controller

It is also good practice to default your Controller when you first install it. This clears out any configuration data, but leaves all IP configuration intact.

1. To default a Controller, turn DIP switch 4 on, then cycle power to the Controller.
2. Once the Controller is running (the fault light is off and status light is flashing once per second), turn DIP switch 4 off again.

Your PCB Controller is now ready to connect to the Protege GX Server.



Keypad Configuration

Accessing the Configuration Menu

Before the Protege LCD Keypad module can communicate, it must be assigned an address. This, and other settings, are configured using the device configuration menu:

1. Apply power to the device and when the keypad version information is displayed, press the ⓧ key followed by the ↵ key
2. The configuration menu is displayed
3. Scroll the available options by pressing the ▼ and ▲ keys and use the ↵ key to select the menu item.

The configuration menu can only be accessed when the device powers up. It cannot be accessed when the system is operational.

Setting the Keypad Device Address

The address selection sets the address of the LCD Keypad. This address must be a unique address in the system below address 250.

```
Enter keypad
address: 001
```

- Use the numerical keys 0 to 9 to program the address and press the ↵ key to save the setting.
- To exit without making changes press the ❐ key.

Adjusting the Display Contrast

The display contrast setting adjusts the LCD display contrast settings.

```
    Contrast
 [*******    ]
```

- Use the ◀ and ▶ keys to adjust the contrast and press ↵ to save the setting.
- To exit without making changes press the ❐ key.

Resetting a Keypad to Factory Defaults

The default setting resets the keypad to the factory default settings.

```
Press [ENTER] to
default keypad.
```

- Press ↵ to default the keypad.
- To exit without defaulting the keypad press the ❐ key.

Displaying Keypad Version Information

The version menu option displays the version and build information of the keypad.

```
ICT Protege LCD
Keypad Ver 1.44
```

- Press the ❐ key to exit.

Review Questions

How do you default a DIN Rail Controller?

- □ Use the web interface to connect to the Controller, then click on Restart
- □ Wire a link between D0 and L1 of reader port 2, then cycle power
- □ Turn on DIP switch 4, then cycle the power
- □ Log in at a keypad, then select [Menu] [4] [2] [2] [Enter]

If the IP address of a DIN Rail Controller is unknown, how can you find it?

- □ Turn DIP switch 3 on, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222
- □ Connect a keypad, press [Menu] [4] [Arm], then scroll down three times
- □ Use the web interface to browse to the default IP address of 192.168.1.2
- □ Connect a link from L1 to D0 on reader port 2, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222

What is the default IP address of a DIN Rail Controller

- □ 192.168.1.2
- □ 192.168.1.3
- □ 192.168.111.222
- □ 255.255.255.0

When the IP address of a Controller is changed, what additional step(s) must be taken?

- □ Perform a module update
- □ Save the settings
- □ Cycle power to the Controller
- □ Save the settings, then restart the Controller

If the IP address of a PCB Controller is unknown how can you find it?

- □ Turn DIP switch 3 on, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222
- □ Connect a keypad, press [Menu] [4] [Arm], then scroll down three times
- □ Either of the above
- □ Connect a link from L1 to D0 on reader port 2, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222

How do you access Telnet for the first time on a Windows 7 PC?

- □ Start > Run, type CMD and press [Enter], then type telnet [Controller IP] 10001
- □ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Client
- □ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Server
- □ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Server and Telnet Client

What is the default IP address of a PCB Controller?

- □ 192.168.1.2
- □ 192.168.1.3
- □ 192.168.1.100
- □ 192.168.111.222

How is the module address set on a Protege LCD keypad?

- □ Using DIP switches
- □ From the Keypad Configuration Menu: [X] at version info during power up
- □ From the Keypad Configuration Menu: [Menu], [4], [Arm] once the system is operational
- □ Using the Module Address tool from within the GX software

Module 125: Protege GX System Design

A detailed system design put together up front will result in a much smoother and efficient installation and configuration process. This module outlines the requirements for designing a Protege GX system.

In This Module

Identifying Requirements

A well planned system design will result in a much smoother and efficient installation and configuration process. It is important to get as much information about what the end user is trying to achieve early on.

Sit down with your end user or consultant and run through their requirements. Try to keep the design as simple as possible. Ask the questions that will give you all the information you need for your system design.

The Five W's of System Design

When designing an access control system, the five W's need to be asked:

- Who are the people we are managing?
- What are the people allowed to do?
- Where are the people allowed to go?
- When are they allowed to do these things or go these places?
- Why did someone do something or go somewhere?

The first 4 questions relate to system design, the last is about monitoring and reporting from the system once it is up and running. All are important to think about before you install or program your system.

Determine Areas to be Managed

First, look at the key areas that need to be managed.

- Where are the entry points to the areas?
- How are we going to control access to these areas?
- Do we need to know when people are exiting these areas as well as entering them?
- Do we need intruder detection in these areas?

From this information, we can list our physical hardware and areas required.

Determine Schedule Requirements

Secondly, find out what times the Users come and go.

- Are there people that need to access the building 24/7?
- Are there standard office hours?
- Are there multiple shift times?
- Should managers be given extended access times?

Answers to these questions will allow us to create our schedules.

Determine User Requirements

Next, we need to look at the people we are trying to manage.

We need a list of these people, and we need to group them by function. For example, Managers, Office staff, Cleaners.

This, along with the information we already have will allow us to create our Users and Access Levels.

Determine Information Requirements

Finally, the why part of the questioning relates to how the end user intends to extract information from the system once it is up and running. Are they going to have operators actively monitoring the system, or are they only intending to generate reports as required?

Once you have all this information, collate it into a design document which all parties agree on. This document will be used throughout your installation and programming.

Understanding Physical Design

Cable Selection

Perhaps one of the most important yet most commonly overlooked design considerations is the selection of the right cable types. While cost savings in materials can be made by selecting lower cost cables, the cost of troubleshooting and resolving issues that often arise from using such cable usually outweigh the benefits.

CCA Cables

While Copper Clad Aluminium cables are attractive from a cost point of view, there are a number of negative side effects.

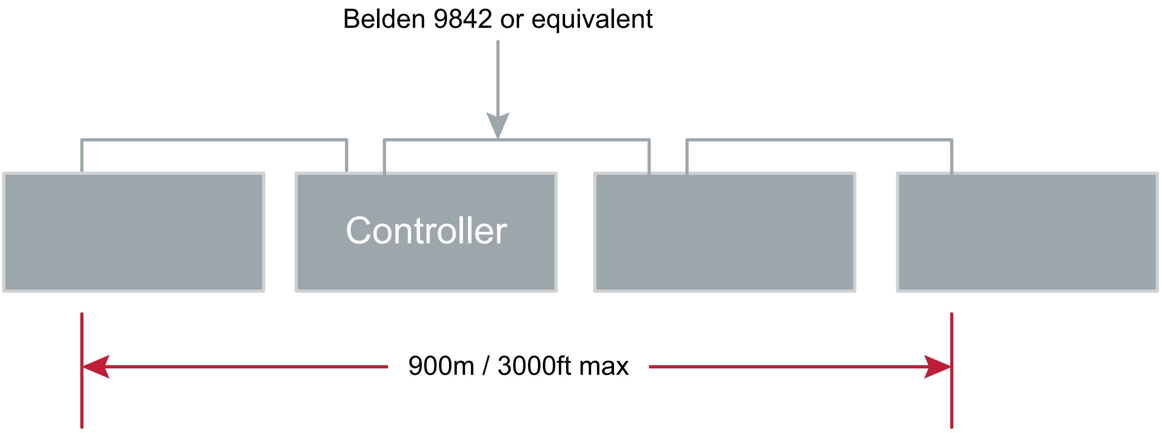
- Higher attenuation (signal strength lost over shorter distance)
- Lower tensile strength (subject to damage if pulled too tightly during installation)
- Poor flexibility
- Higher temperature rises when carrying higher currents
- Exhibit oxidation of exposed aluminium at points of connection
- ICT recommends against the use of CCA cables, especially for Module Network and Reader connection.

RS-485 Module Network

While RS-485 is quite a robust network solution, any data transmission can be affected by noise.

Cat5e and Cat6 data cables were not designed to be used in RS-485 networks. While it can be used, it is recommended that a cable specifically designed for RS-485 networks, such as Belden 9842 is used.

This is a Shielded, twisted pair, multicore cable. This is especially important for longer network runs, and in electrically noisy environments.



Reader Cable Type

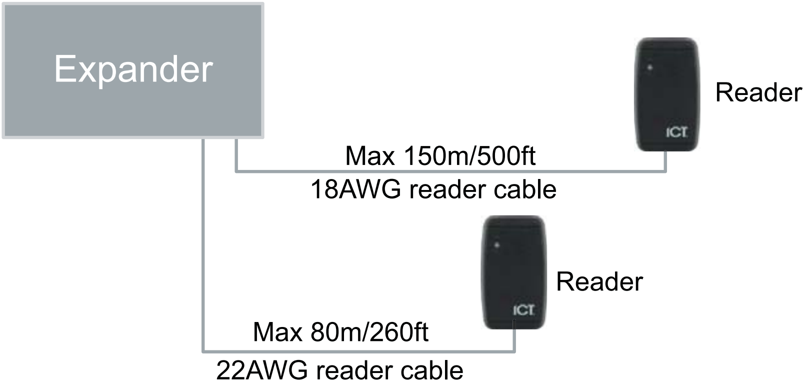
Wiegand readers also rely on data transmission, and can therefore be affected by noise. Cat5e and Cat6 data cables were not designed to be used for wiegand readers.

It is recommended that a cable specifically designed for Wiegand readers, such as Alpha 5388c is used. This is a Shielded, non twisted multicore cable.

Reader Cable Distance

The maximum distance between the reader and expander is 150m / 500ft if using an 0.8mm or 18AWG cable such as Alpha 5386c or 5388c.

If using a 0.6mm or 22AWG cable such as Alpha 5196c or 5198c, the maximum recommended distance is 80m / 260ft.



Voltage Drop

An important consideration for cable selection, especially for devices with a high power demand, such as locks is Voltage Drop. As the distance of a cable increases, so too does its internal resistance. This leads to voltage drop.

Take an average Maglock for instance.

- Running at 12 volts, it will draw around 500mA.
- If this was connected to a PSU-DIN via a 0.5mm security cable, the voltage drop across the cable would bring the voltage at the lock to below 12 volts after just 26m (85ft).

Voltage Drop Calculation

While it is recommended that voltage drop calculations are made with every system design, the following table offers a general guide.

	0.2mm	0.5mm	0.6mm	0.8mm	1mm	2mm
PIR	150m	225m	300m	X	X	X
Keypad	100m					
Reader	X	X	80m	150m	X	X
Strike / Drop Bolt	X	30m	40m	100m	160m	250m
Mortice / Single Mag	X	15m	20m	50m	80m	130m
Double Maglock	X	X	10m	25m	40m	65m

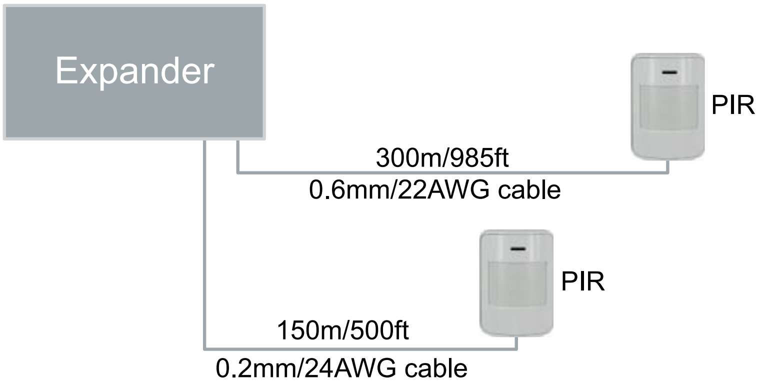
	24AWG	23AWG	22AWG	18AWG	16AWG	14AWG
PIR	500ft	750ft	985ft	X	X	X
Keypad	330ft					
Reader	X	X	260ft	500ft	X	X
Strike / Drop Bolt	X	100ft	130ft	330ft	525ft	820ft
Mortice / Single Mag	X	50ft	65ft	165ft	260ft	425ft
Double Maglock	X	X	30ft	80ft	130ft	210ft

For more reading on calculating Voltage Drop, see http://en.wikipedia.org/wiki/Voltage_drop

PIR Cable Distance

The maximum distance between an expander and any security detection device is 300m or 985ft.

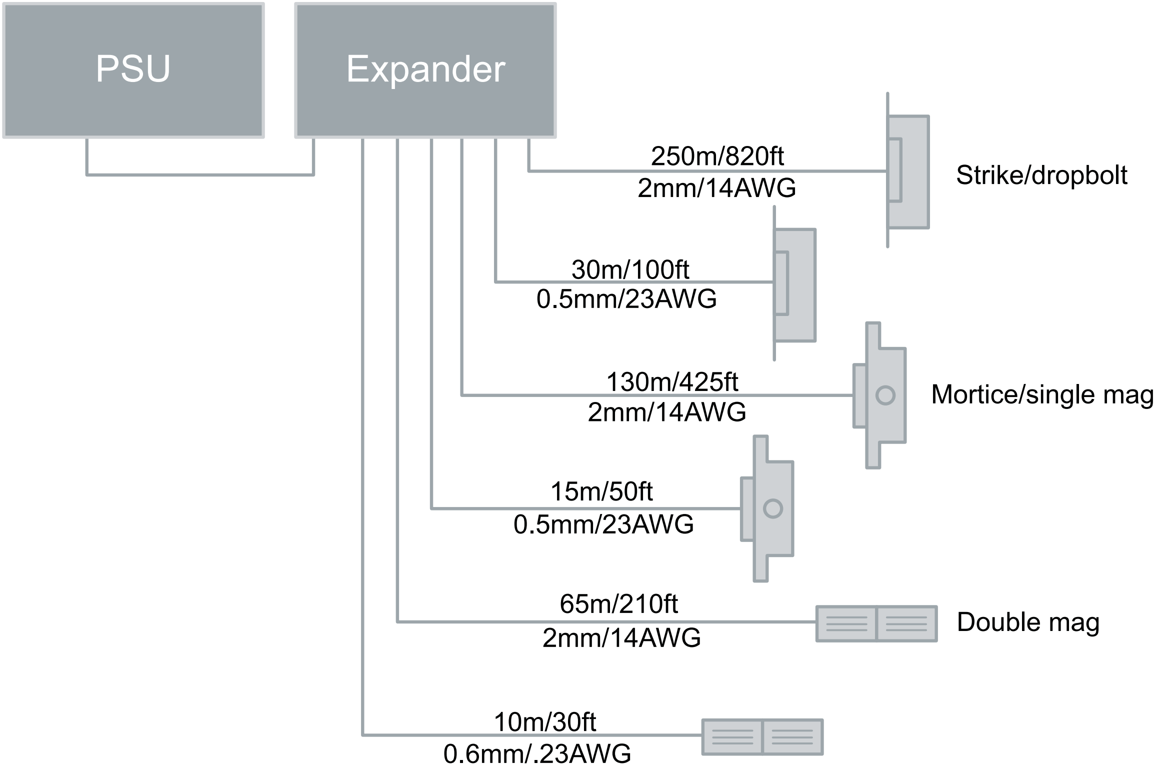
Power consumption should also be considered. The diagram below sets general guidelines for ICT PIRs.



Lock Cable Distance

Incorrect conductor sizing for lock power can lead to:

- Cable degradation
- Lock malfunction
- Decreased bond strength
- PSU overload



Output Wiring

If a Controller or expander loses power for any reason, all relays will return to their un-powered state. When designing a system it is a good idea to consider what would happen in failed condition to any devices you may be controlling with these relays.

Output terminals are labeled in their un-powered state. Where a terminal is labeled NC or Normally Closed this set of contacts will be closed when the output is off.

If your system was specified to control some lighting, it would be a good idea to use the NC or Normally Closed terminals to do this. If for some unexpected reason, the module fails and the output turns off, then the lights being controlled would be turned on. Ultimately, in a failed state it would be better for the lights to be stuck on than stuck off.

This can however lead to programming confusion, but as long as smart naming conventions are used, this can be avoided.

For instance, the above example could be labeled Lighting Control (ON to de-energize).

Power Supply Design

Any system is only as good as the power supply behind it.

Wherever possible, the following should be adhered to:

- Module network power should be from a **dedicated** feed.
- Lock power should be **separated** from other devices.
- PSU average load should be kept **below 75%** of rated capacity.
- Batteries should **always** be connected to the PSU.

Power supply loading calculations should always be carried out to ensure you have enough power to keep your system running under all conditions.

Device Intelligence

Device intelligence refers to a devices ability (or lack of) to continue functioning if connection to the rest of the system is lost.

A fully intelligent solution is one that appears to behave in the same manner regardless of whether it is connected to the rest of the system or not.

Controller Intelligence

The Protege GX Controller is a fully intelligent device. If communications are lost to the server the Controller will continue to function stand-alone as per the last received configuration.

- Areas can still be armed and disarmed
- Access will still be granted or denied
- Schedules will be followed
- Events will be stored locally
- Off site monitoring will continue to function if a path to the monitoring station is still available

Non-Intelligent Devices

Devices that are designed to expand the Controllers functionality are often non-intelligent. These devices rely on the Controller for instructions on how to operate. They include:

- Input expanders
- Output expanders
- Keypads
- RDM2 and RDS2 reader expanders
- Analog expanders

These devices will have limited or no functionality if they lose their RS-485 Module Network connection to the Controller.

Offline Behavior

Input Expanders

When RS-485 communications are lost, input expanders continue to process the states of inputs, however it is the Controller that is responsible for carrying out any actions required such as triggering sirens or off site monitoring.

- Input expanders do not store events, so if an input opens and closes while the expander is offline, it will never be logged or actioned.
- If an input changes state while offline and remains in the new state, it will be logged and actioned when the expander comes back online.

Because the input state is still processed, LED operation will continue to follow the state of the input while it is offline.

Output Expanders

When RS-485 communications are lost, output expanders will keep all outputs in the same state they were last in.

- If an output was supposed to change state for any reason, it will not happen while the module is offline.
- When the module comes back online, the Controller updates the expected states of all the outputs.

Reader Expanders

All Protege reader expanders have three programmable modes of operation which they will follow if communications to the Controller are lost.

1. No Users (Entry is denied for everyone)
2. Any card (Entry is granted for any card that can be read)
3. First 10 users + Cache (The first 10 programmed users and a number of stored users will be allowed access)

Offline Operation

No Users

The No Users mode of offline operation should only be used for perimeter and high security doors.

- In this mode of operation, all card and / or PIN access attempts will be denied.
- REX or request to exit will be granted, and an offline warning of four short beeps will be emitted from any readers attached to the door.
- If this mode is selected, it is critical that another means of entry to the area is provided. This could be through an alternative door, via a key override switch or an emergency break glass switch.

Any Card

The Any card mode of offline operation should only be used for high volume internal low security doors. In this mode of operation, all card and / or PIN access attempts will be granted. All granted events, including REX events will generate the offline warning of four short beeps from any readers attached to the door.

There are two important points to remember with this mode:

1. Any card that can be read by the reader will be granted access
2. Any PIN entered at a reader in Card or PIN or PIN only mode will be granted access

First 10 Users + Cache

The First 10 users + Cache mode of offline operation is recommended for most doors.

- In this mode of operation, access will be granted for the first 10 programmed users (usually the most important people on the system, such as the installer and master).
- Access will also be granted for a number of cached offline users.
- All granted events, including REX events will generate the offline warning of four short beeps from any readers attached to the door.

RDM2 & RDS2

The RDM2 and RDS2 reader expanders are non-intelligent reader expanders, and will function as follows in offline mode.

- In the cached mode of offline operation, the RDM2 and RDS2 will currently grant access for any card that has a facility code matching one of the last 50 facility codes to be presented. This is currently being reviewed and is likely to change in the near future.
- Events will not be stored while in offline mode.
- Schedules will not be followed while in offline mode.
- Doors that are unlocked will lock while in offline mode.
- Door alarms such as DOTL and Forced will not be processed while in offline mode.
- If an input used for intruder detection opens and closes while the expander is offline, it will never be logged or actioned.
- If an input used for intruder detection changes state while offline and remains in the new state, it will be logged and actioned when the expander comes back online.

Because the input state is still processed, LED operation will continue to follow the state of the input while offline.

RDI2 & RDE2

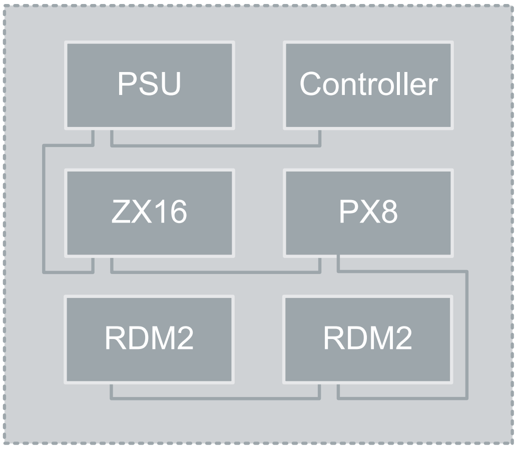
The RDI2 and RDE2 reader expanders are intelligent reader expanders, and will continue to function as follows in offline mode:

- The first 2000 users in the controllers database are stored in the reader expander's offline database and will be granted access based on the their configured access levels.
- The last 2000 events will be stored while in offline mode and uploaded to the controller once online.
- Schedules will be followed while in offline mode.
- Doors that are unlocked by schedule will remain unlocked while in offline mode, until they are scheduled to be locked again.

The reader expander's offline database can be configured to be updated once per day at a specified time. When updated a copy of the currently programmed settings in the controller is sent to all connected intelligent reader expanders.

Robust RS-485 Engineering

When engineering your system, a good system design will attempt to avoid situations where expanders are forced into their offline mode.



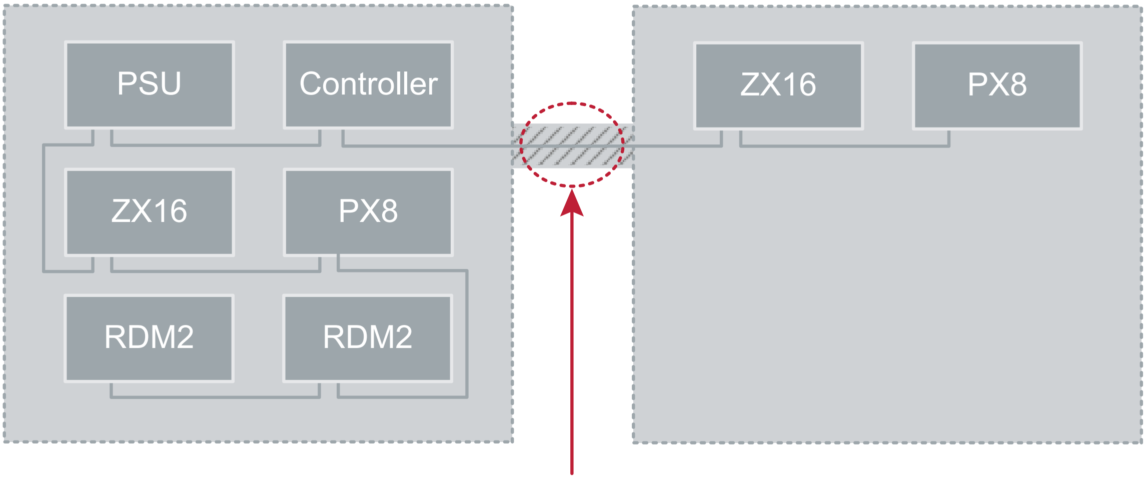
* RS-485 Protected by Cabinet

If RS-485 standards are followed, the correct cable used and the cable is protected, the RS-485 module network has an extremely low failure rate.

Expanders that are located in the same cabinet as the Controller are very unlikely to fail, and are therefore considered to be a robust solution.

Centrally Located Equipment

Where cabinets are located together, and the RS-485 cable is well protected between them, this solution is also considered robust.

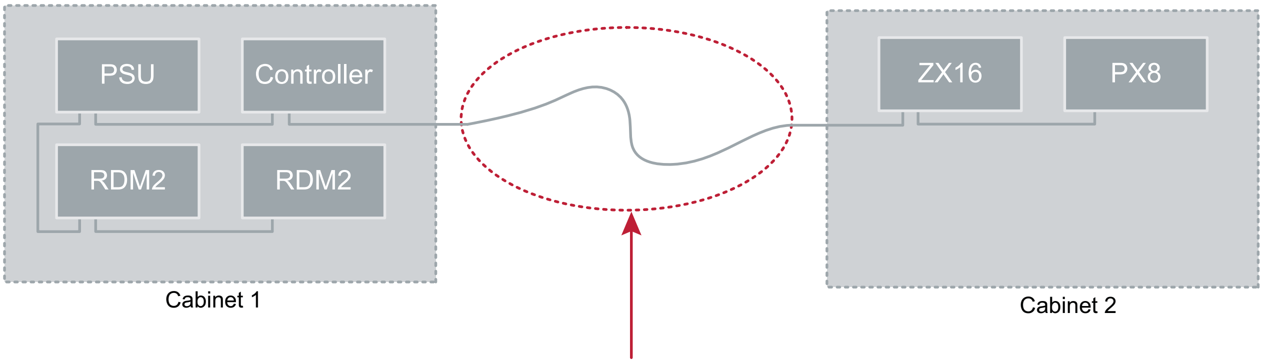


Cable protected by conduit

Centrally locating equipment and running cable out to field devices can often be a cost effective way of providing a robust solution.

External RS-485 Cabling

However, when the RS-485 Module Network leaves the cabinet, it is at risk of being damaged.



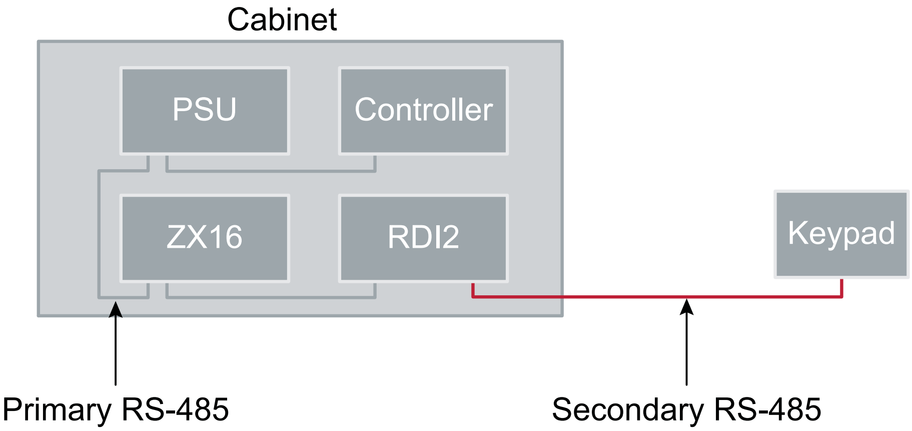
Cable is at risk of being damaged

If the cable is completely cut here, the ZX16 and PX8 in Cabinet 2 will cease to function.

If the RS-485 Module Network cable is well run, and protected by cable tray or conduit where applicable, it is unlikely to be damaged, and therefore unlikely to present a problem, however this is a risk that must be considered during the designing and planning of a new system.

Sometimes the RS-485 Module network must leave the cabinet. For instance, when a keypad is required on the system.

If the integrity of the RS-485 Module Network is critical, then an intelligent reader expander with an isolated secondary module network can be used.



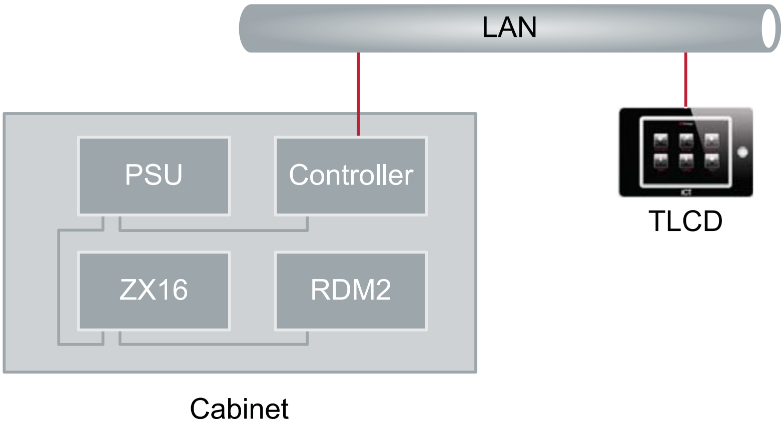
Now if the cable outside the cabinet gets cut, it will only affect the keypad.

*Alternatively, a 3rd party RS-485 LAN isolator can be used.

Utilizing Ethernet

Another option for a robust system design is to use Ethernet.

Although an ethernet cable can still be cut or damaged, it is much less likely to affect the rest of the network.

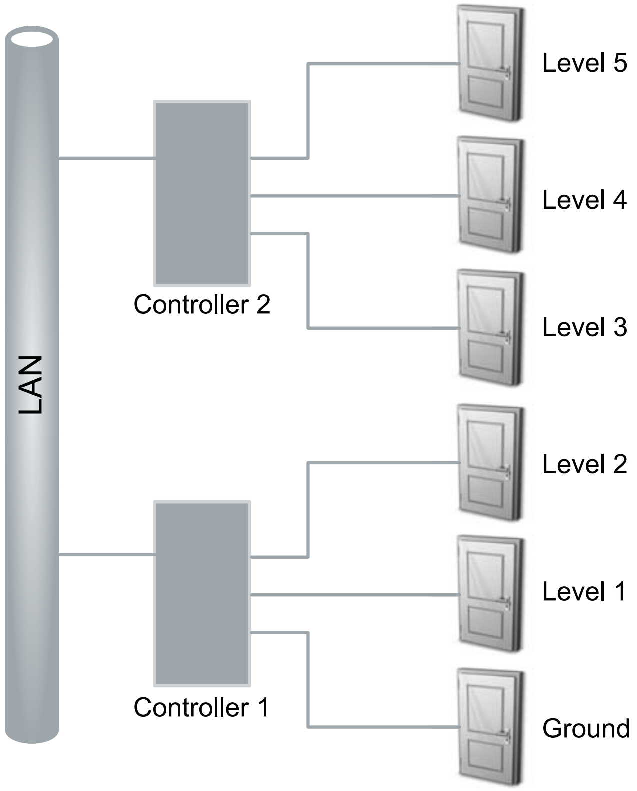


- The Controller connects to the network using ethernet.
- The RS-485 Module Network and expanders are protected inside the cabinet, and a TLCD touchscreen is used for arming and disarming the system.

Not only does the TLCD offer more functionality for the end user, it also protects the RS-485 module network by being completely isolated.

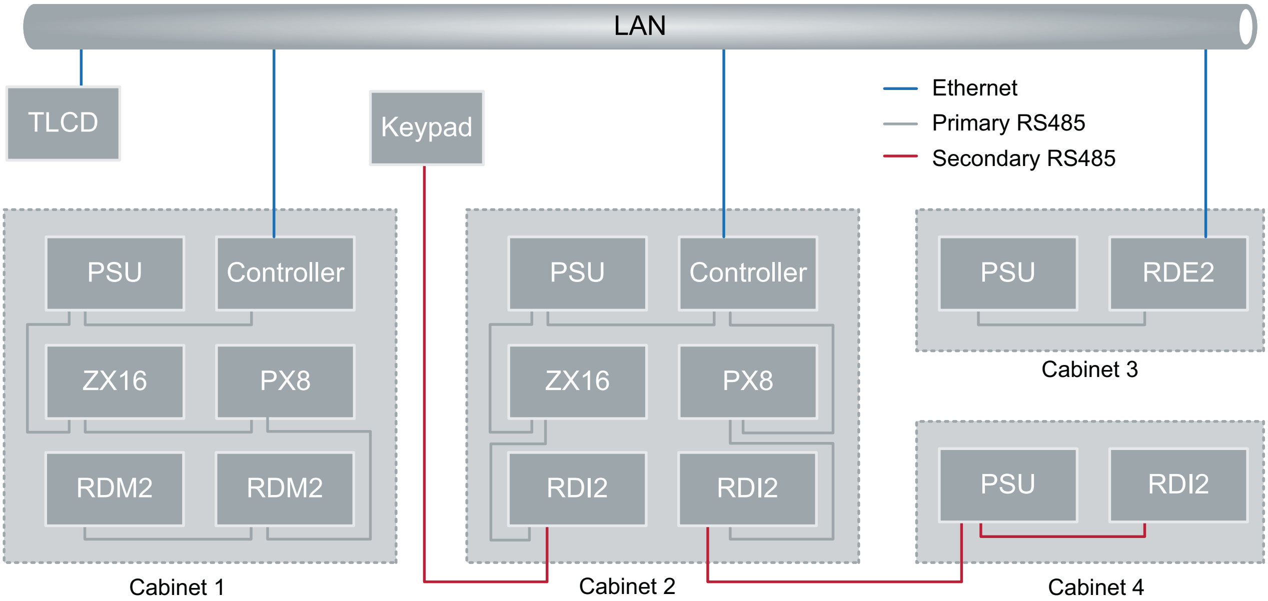
Multiple Controllers

Protege GX not only supports the connection of multiple Controllers, it was built around this scalability.



This provides even more options for designing a large, but robust solution.

Robust Design Summary



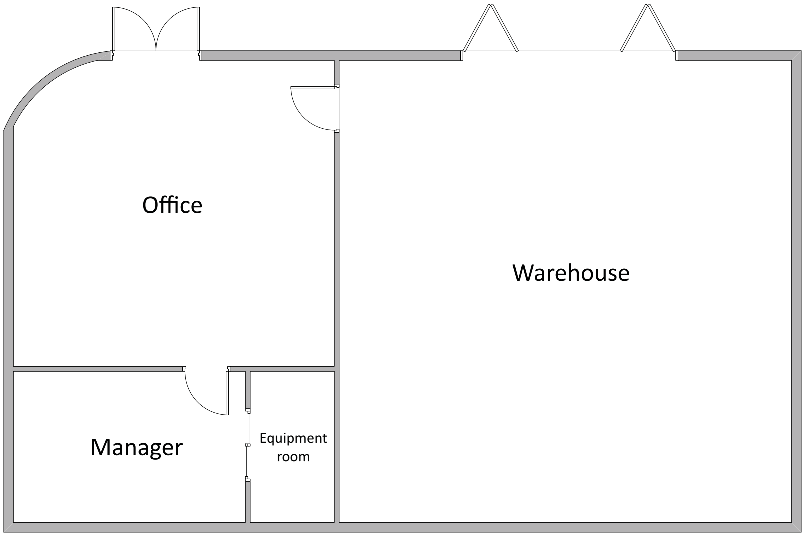
As you can see, there are many ways of creating a robust solution. With the flexibility of the Protege system, a robust solution for most budgets should be achievable.

Planning the Training System

Our training scenarios are based on our fictitious client - ACME International. We will be installing an access control system in their Texas office.

Training Scenario

Acme have provided us with a basic building plan:



From this plan, we can easily identify 3 areas:

1. Office
2. Managers Office
3. Warehouse

Looking at the entry points on our plan, and our discussions with Acme, we can determine that the two external entry points should require a card and PIN for entry after hours. The internal doors will only require a card, and the Office Entry Door should automatically unlock and lock based on office hours. The Warehouse should remain secure at all times and require access control on both sides of the doors.

Door	Type	Internal Area	Schedule
Office Entry Door	Card/PIN entry, REX exit	Office	Office Hours
Managers Office Door	Card entry, REX exit	Managers Office	None
Warehouse Roller Door	Card/PIN entry, Card exit	Warehouse	None
Office to Warehouse Door	Card entry, Card exit	Warehouse	None

To provide intruder detection, we will need the following detectors:

- Office PIR
- Managers Office PIR
- Warehouse PIR

To provide system control, we will install a keypad in the Office.

We have established that the manager will be allowed access to the entire building 24/7. The office staff will be allowed access to the Office from 9am to 5pm, Monday to Friday, and the Warehouse only when warehouse staff are present. There will be two shifts in the warehouse, one from 6am to 2pm and one from 10am to 6pm. There will also be a Warehouse Supervisor who will be allowed access to the warehouse through both shifts. All warehouse staff will be allowed to access the office if there are office staff present.

After discussing the above, we have defined five Access Levels.

1. Manager
2. Office
3. Warehouse Supervisor
4. Warehouse Shift 1
5. Warehouse Shift 2

We have asked Acme to supply a list of employees, their corresponding Access Levels, and PINs.

Hardware Design

From our system design, we specify the following hardware:

- 1 Controller (2 doors)
- 1 RDM2 Reader Expander (2 Doors)
- 1 Power Supply (4.0A)
- 2 Multi Prox Readers
- 4 Nano Readers
- 1 Keypad
- 3 PIR's

We need to confirm that our power supply is sufficient to drive our system:

Device	Current mA (avg)	Quantity	Load A (avg)
Total Module Network Load			2.70
Protege DIN Rail Controller	150	1	150
Protege Mini 2 Reader Expander	83	1	83
Protege Alphanumeric LCD Keypad	38	1	38
Protege Readers	130	6	780
Protege PIRs	15	3	45
Relays	15	1	15
Locks	500	3	1500
Siren	85	1	85

We also need to check that we have enough inputs for our system:

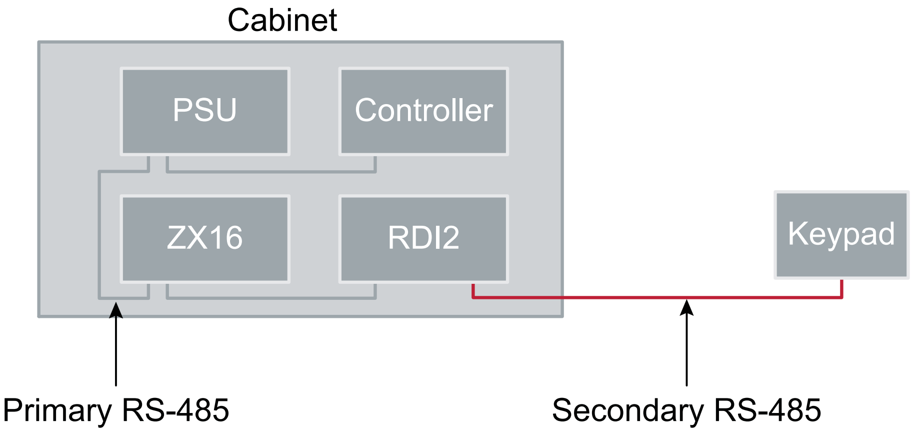
Input	Description
CP1:1	Office Entry Door (Reed)
CP1:2	Office Entry Door (REX)
CP1:3	Office Entry Door (Bond)
CP1:4	Office (PIR)
CP1:5	Managers Office Door (Door)
CP1:6	Managers Office Door (REX)
CP1:7	Managers Office Door (Bond)
CP1:8	Managers Office (PIR)
RD1:1	Warehouse Roller Door (Reed)
RD1:2	Warehouse (PIR)
RD1:3	-
RD1:4	-
RD1:5	Office to Warehouse Door (Reed)
RD1:6	-
RD1:7	Office to Warehouse Door (Bond)
RD1:8	-

Review Questions

Where should copper clad aluminium cables be used?

- □ For Reader connection
- □ For RS-485 Module Network connection
- □ CCA cables should be used wherever possible due to its higher attenuation
- □ The use of CCA cables should be avoided

If the keypad cable was damaged, causing a short across all conductors, what would happen?



- □ The Keypad would stop functioning. The RDI2 would stop functioning. Everything else would continue to function properly.
- □ The Keypad would stop functioning. Everything else would continue to function properly.
- □ Everything would continue to function properly.
- □ The Keypad would stop functioning. The RDI2 would go into offline mode. Everything else would continue to function properly.

In Offline Operation...

A front door of a retail shop is connected to an RDI2-DIN intelligent reader expander which is programmed for 'First 10 Users + Cache' mode. The door is programmed to unlock at 9am and lock at 5 pm. Jane, one of the shop staff, is programmed as User 202. If the expander was to go offline at 5am, what would happen?

- □ The door would not unlock at 9am. Jane would be granted access.
- □ The door would not unlock at 9am. Jane would not be granted access.
- □ The door would unlock at 9am. Jane would be granted access.
- □ The door would unlock at 9am. Jane would not be granted access.

What happens to...?

A lighting circuit is connected to an output on a PX8-DIN module that is programmed to turn on at 8pm and off at 5am. The expander goes offline at 4am, then comes back online at 10am. What happens to the lights after the expander goes offline?

- □ The lights turn off at 5am.
- □ The lights turn off at 10am.
- □ The lights turn off at 4am.
- □ The lights turn off at 5am the following day.

What happens when...?

If a door is connected to an RDM2 that has been programmed for 'No Users' offline operation, and the module has gone offline, what happens when a user requests exit using a REX button?

- □ The door is unlocked. The reader does not beep.
- □ The door is not unlocked. Four short beeps are given at the reader.
- □ The door is not unlocked. The reader does not beep.
- □ The door is unlocked. Four short beeps are given at the reader.

Module 128:
Protege GX Software Installation

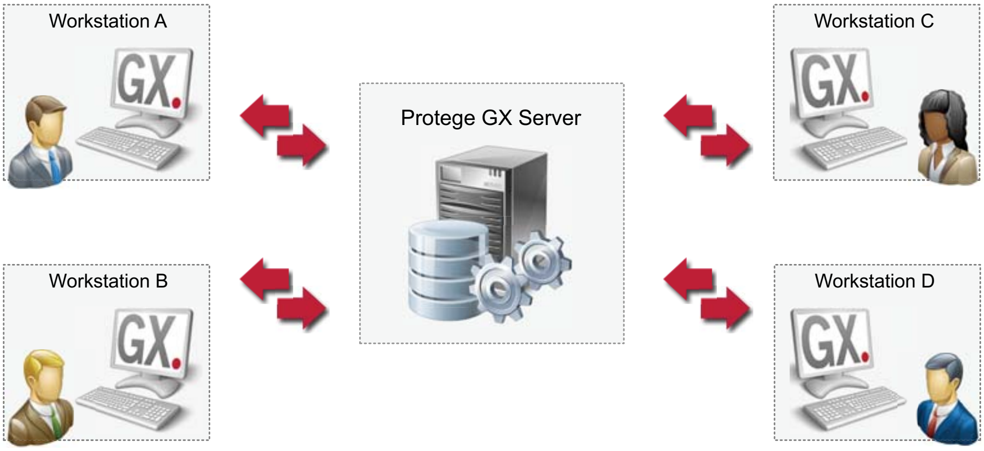
This module outlines the requirements and procedure to install Protege GX.

In This Module

Protege GX System Requirements

Client/Server Architecture

Protege GX uses a client/server architecture. Every installation includes a server which holds the main system database and the Protege services. In most cases it will also have the client software installed. The client application is then installed on additional (remote) workstations enabling multiple operators to access the system. These workstations connect to the database and services on the Protege GX Server.



Server Requirements: Standard Installation

A standard installation consists of up to 10 system controllers connected over Ethernet, each communicating with up to 16 modules:

- Intel® Dual Core Machine 2.8GHz
- 4 GB RAM
- 40 GB free disk space
- Mouse / Keyboard
- Ethernet 10/100MBs

Server Requirements: Multiple Controller Site

A multiple controller installation consists of over 100 controllers operating as multiple sites, or a single site running multiple Controllers. Each controller may have any number of modules connected. The connection to the controllers may be over any variety of communication mediums and can communicate independently or on demand.

For best performance, connect using an Ethernet 10/100Mbs connection or similar over a local LAN or WAN network.

- Intel® Quad Core, 2.8GHz or Higher
- 8 GB RAM
- 100 GB free disk space
- Mouse / Keyboard
- Dual Ethernet 10/100MBs

Client Workstation Requirements

- Intel® Dual Core Machine 3GHz
- 4 GB RAM
- 40 GB free disk space
- DirectX 10 Compatible Video Card
- Mouse / Keyboard
- Ethernet 10/100/1000MBs

DVR Integration

When integrating with a DVR system, the DVR system will have its own minimum system requirements. It is important that you check with the manufacturer prior to installation to ensure that your machine meets these specifications.

Supported Operating Systems

Protege GX is supported on the following operating systems:

- Microsoft Windows Server 2008 R2 (Recommended for Server)
- Microsoft Windows Server 2008 SP2
- Microsoft Windows Server 2003 SP2
- Microsoft Windows 7 Professional (Recommended for Client)
- Microsoft Windows Vista SP2

SQL Server Editions

Protege GX uses a non-proprietary open SQL database engine to store and share information. Protege GX is compatible with the following versions of Microsoft SQL Server in either Standard, Enterprise, or Express editions:

- SQL Server 2008 R2 (recommended)
- SQL Server 2008
- SQL Server 2005

SQL Server Express is a scaled down, free edition of SQL Server that includes the core database engine and functionality. It provides an alternative to the Standard or Enterprise edition which requires additional Microsoft licenses.

For your convenience, the setup files for SQL Server Express 2008 R2 are included as part of the full distribution package.

Prerequisites

Before installing Protege GX, you must have installed:

- Microsoft .NET Framework v4.0
- Microsoft SQL Server 2008 R2, 2008, or 2005 (required on server machine only)

Microsoft SQL Server also has its own set of prerequisites:

- Microsoft Windows Installer v4.5
- Microsoft .NET Framework v3.5 SP1
- Microsoft Windows PowerShell v1.0

Administration Permissions

To successfully complete installation, you must have local administrative privileges on the workstation(s) you are performing the installation on. This ensures you have the necessary permissions to create and modify any of the files or folders on the computer, as well as change any settings.

Installation Procedure

There are several steps required to install Protege GX:

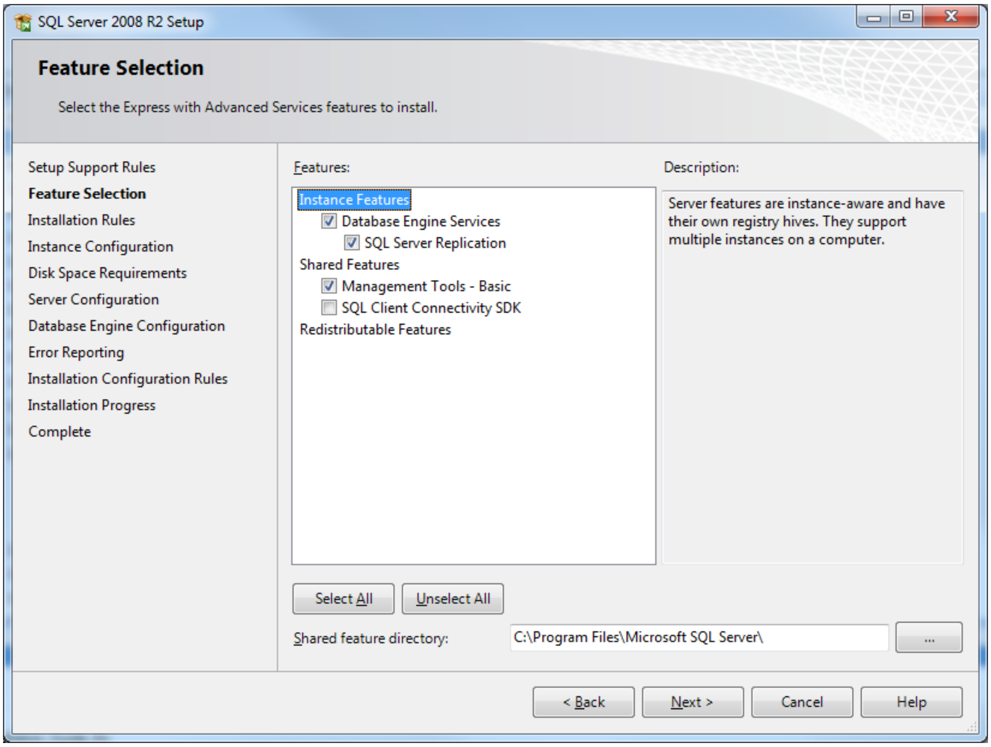
1. Install Microsoft SQL Server the database system used to store all Protege GX configuration information and events.
2. Install the Protege GX Server Components on the server. This installs the database, services, and the client (unless deselected).
3. Install the Protege GX Client on the remote workstations. This installs the user interface that will be used by operators.

Installing Microsoft SQL Server

1. Run the supplied GXSQLSetup.exe file to launch the Protege GX SQL Server Installation wizard.
2. Select the option to Install SQL Server 2008 R2. Progress is shown as the setup files are extracted to a temporary location.

   During setup, checks are performed to ensure that you have the necessary prerequisites required to successfully install SQL Server 2008 R2 Express. If you are missing required components, you will be prompted to install these before continuing.

3. Read and accept the license terms then click Next.
4. Ensure the following features are selected then click Next:
   - Database Engine Services
   - SQL Server Replication
   - Management Tools – Basic



SQL Server 2008 R2 Setup

Feature Selection

Select the Express with Advanced Services features to install.

Features:

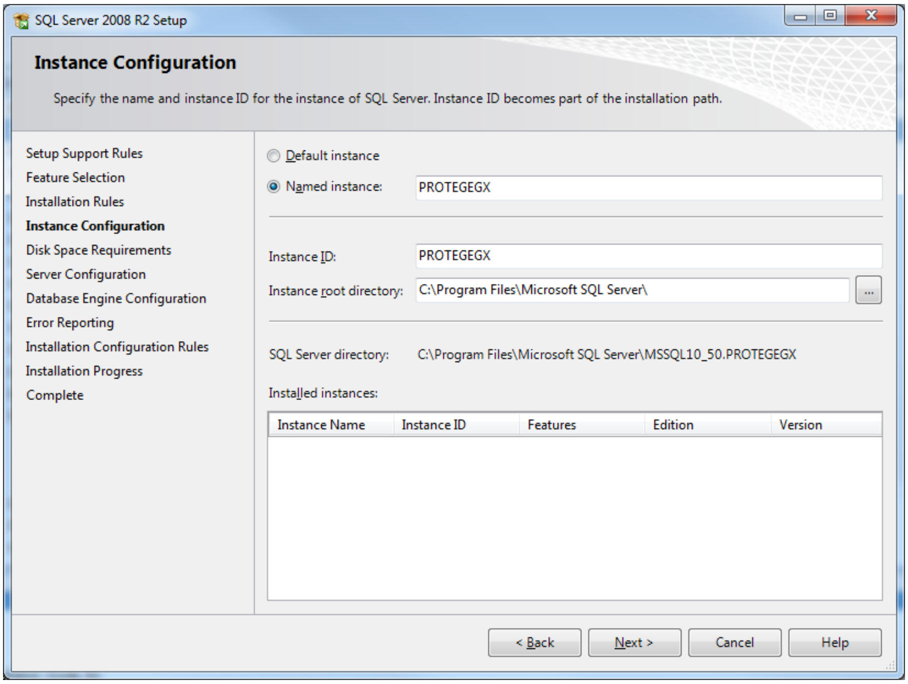
Instance Features
☑ Database Engine Services
☑ SQL Server Replication
Shared Features
☑ Management Tools - Basic
□ SQL Client Connectivity SDK
Redistributable Features

Description:

Server features are instance-aware and have their own registry hives. They support multiple instances on a computer.

Shared feature directory: C:\Program Files\Microsoft SQL Server\

5. Ensure the Named instance and Instance ID are set to **PROTEGEGX** then click **Next** to continue.



SQL Server 2008 R2 Setup

Instance Configuration

Specify the name and instance ID for the instance of SQL Server. Instance ID becomes part of the installation path.

- Setup Support Rules
- Feature Selection
- Installation Rules
- **Instance Configuration**
- Disk Space Requirements
- Server Configuration
- Database Engine Configuration
- Error Reporting
- Installation Configuration Rules
- Installation Progress
- Complete

○ Default instance

● Named instance: PROTEGEGX

Instance ID: PROTEGEGX

Instance root directory: C:\Program Files\Microsoft SQL Server\

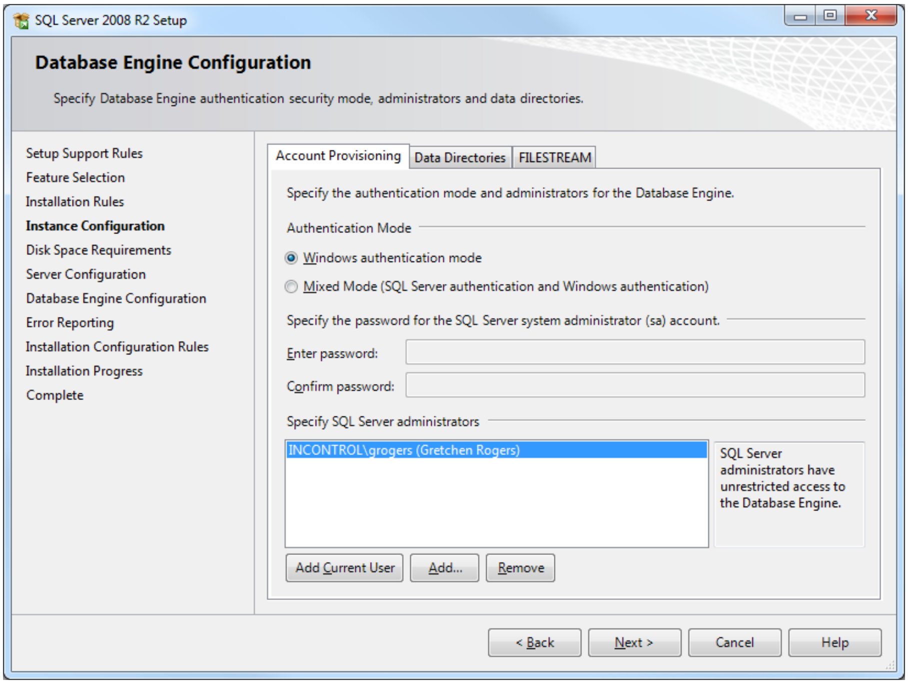
SQL Server directory: C:\Program Files\Microsoft SQL Server\MSSQL10_50.PROTEGEGX

Installed instances:

Instance Name	Instance ID	Features	Edition	Version

6. The Server Configuration details are shown. Click **Next** to continue.

7. The Database Engine Configuration details are shown. Select the Authentication Mode to define how database permissions are created. We recommend **Windows authentication** wherever possible as it provides a single sign-on experience for users and simplifies security management. If choosing Mixed Mode you will need to define a password for the system administrator (sa) account. Click **Next** to continue.



SQL Server 2008 R2 Setup

Database Engine Configuration

Specify Database Engine authentication security mode, administrators and data directories.

- Setup Support Rules
- Feature Selection
- Installation Rules
- **Instance Configuration**
- Disk Space Requirements
- Server Configuration
- Database Engine Configuration
- Error Reporting
- Installation Configuration Rules
- Installation Progress
- Complete

Specify the authentication mode and administrators for the Database Engine.

Authentication Mode

● Windows authentication mode

○ Mixed Mode (SQL Server authentication and Windows authentication)

Specify the password for the SQL Server system administrator (sa) account.

Enter password:

Confirm password:

Specify SQL Server administrators

INCONTROL\grogers (Gretchen Rogers)

SQL Server administrators have unrestricted access to the Database Engine.

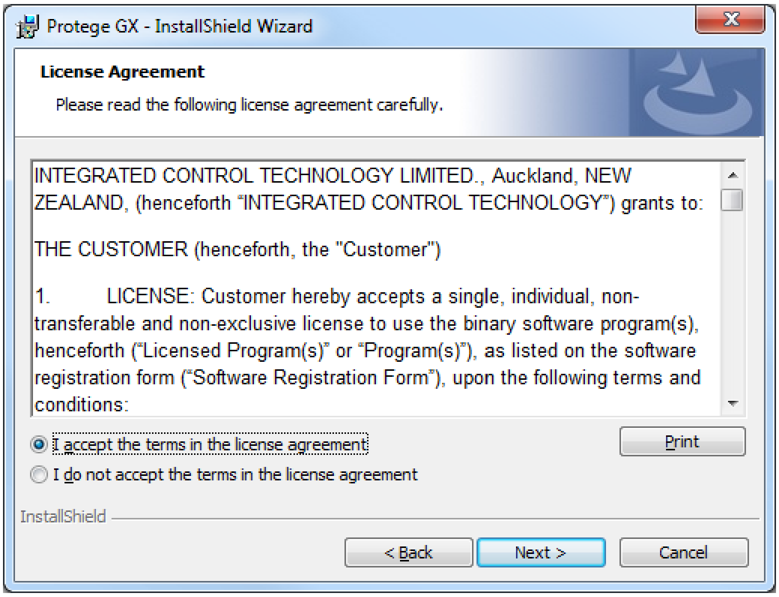
8. If you wish to, enable the error reporting option to automatically send error reports to Microsoft. Click **Next** to continue.

9. Progress is shown as the installation completes. Once finished, click **Close** to exit the setup wizard.

Installing the Protege GX Server

1. Run the supplied **setup.exe** to launch the Protege GX Install Wizard. Click **Next** to start the installation process.

2. Read and accept the License Agreement then click **Next** to continue.



Protege GX - InstallShield Wizard

License Agreement

Please read the following license agreement carefully.

INTEGRATED CONTROL TECHNOLOGY LIMITED., Auckland, NEW ZEALAND, (henceforth "INTEGRATED CONTROL TECHNOLOGY") grants to:

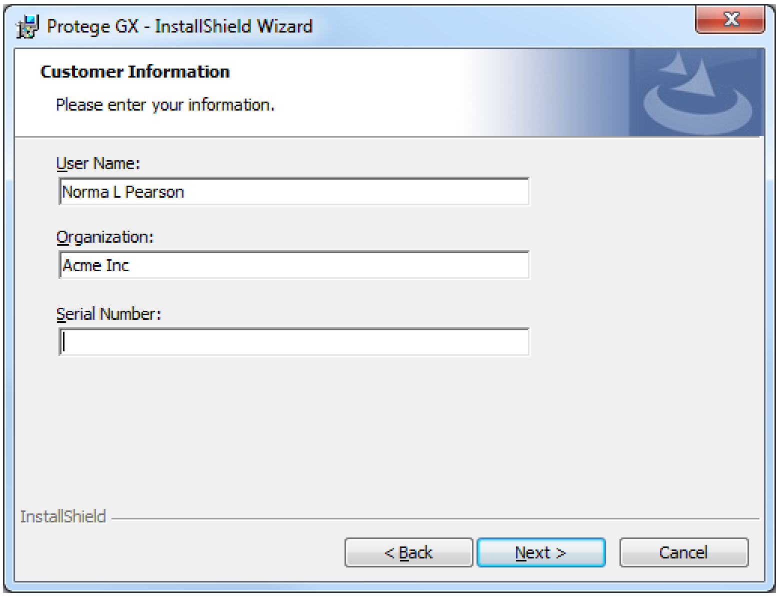
THE CUSTOMER (henceforth, the "Customer")

1. LICENSE: Customer hereby accepts a single, individual, non-transferable and non-exclusive license to use the binary software program(s), henceforth ("Licensed Program(s)" or "Program(s)"), as listed on the software registration form ("Software Registration Form"), upon the following terms and conditions:

● I accept the terms in the license agreement

○ I do not accept the terms in the license agreement

3. Enter your registration information including your name, company, and product serial number then click **Next** to continue.



Protege GX - InstallShield Wizard

Customer Information

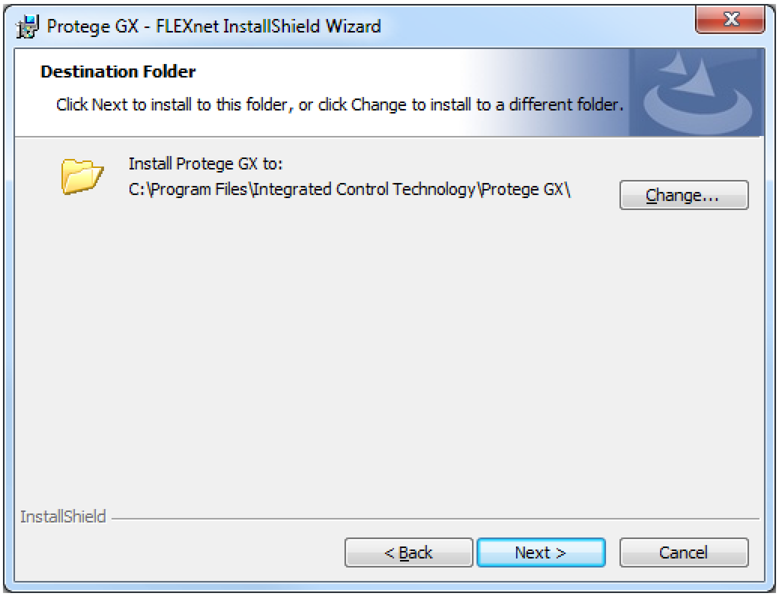
Please enter your information.

User Name: Norma L Pearson

Organization: Acme Inc

Serial Number:

4. Click **Next** to install to the default folder or click **Change** to choose another location. We recommend accepting the default folder.



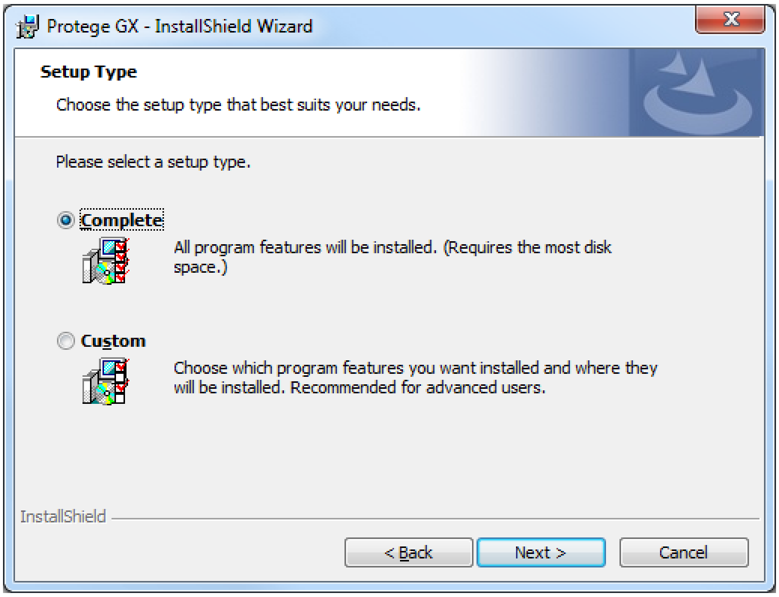
Protege GX - FLEXnet InstallShield Wizard

Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install Protege GX to:
C:\Program Files\Integrated Control Technology\Protege GX\

5. Select the **Complete** setup type then click **Next**. This installs all components including the Protege database, services, and the client application on the server.



Protege GX - InstallShield Wizard

Setup Type

Choose the setup type that best suits your needs.

Please select a setup type.

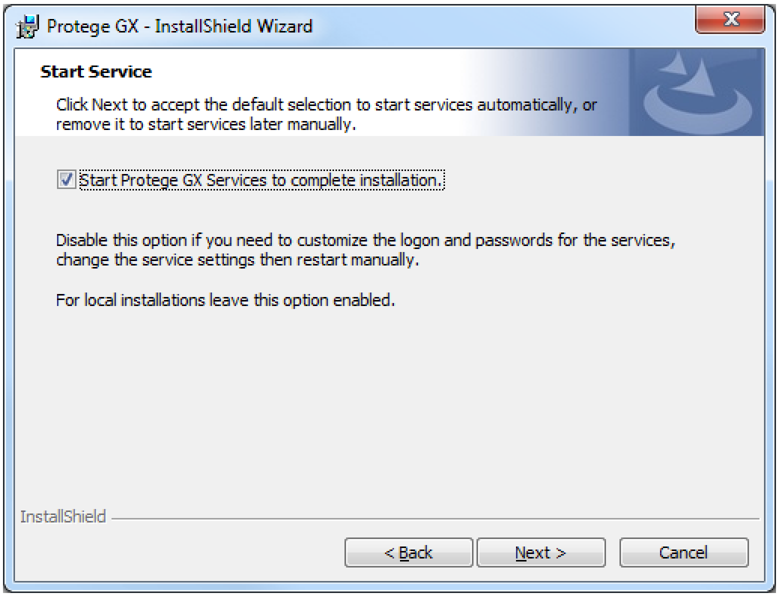
● **Complete**

All program features will be installed. (Requires the most disk space.)

○ **Custom**

Choose which program features you want installed and where they will be installed. Recommended for advanced users.

6. Click **Next** to start the Protege services automatically during installation. By default, services are installed using the local account. If you are performing a remote installation you will need to customize the logon and passwords so should disable this option and configure the services manually after installation.



Start Service

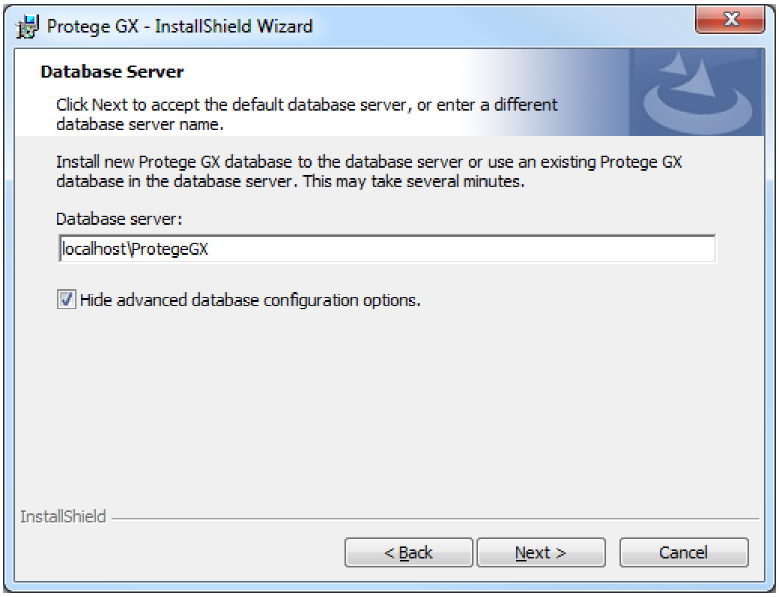
Click Next to accept the default selection to start services automatically, or remove it to start services later manually.

☑ Start Protege GX Services to complete installation.

Disable this option if you need to customize the logon and passwords for the services, change the service settings then restart manually.

For local installations leave this option enabled.

7. Enter the details of the database server where the Protege GX database will be created. Provided you selected the defaults when installing SQL Server, this will be the server name and ProtegeGX (where ProtegeGX is the SQL instance). Click **Next** to continue.



Database Server

Click Next to accept the default database server, or enter a different database server name.

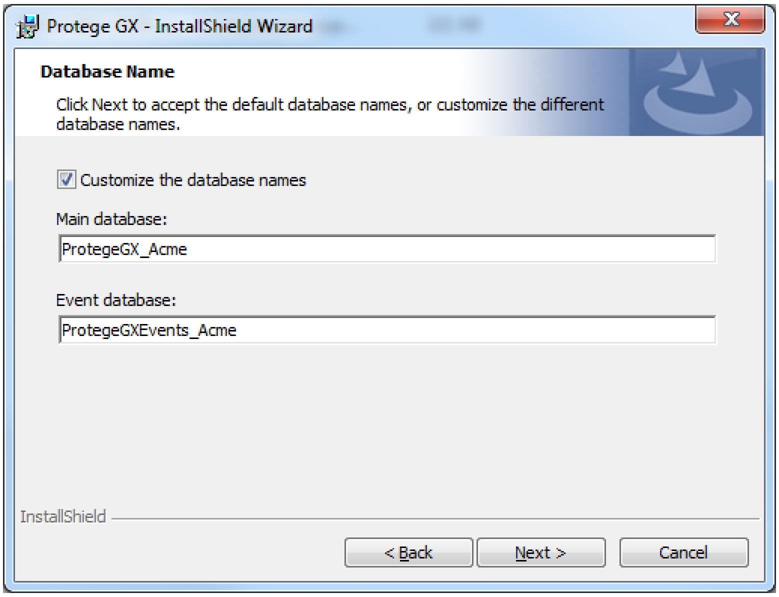
Install new Protege GX database to the database server or use an existing Protege GX database in the database server. This may take several minutes.

Database server:

localhost\ProtegeGX

☑ Hide advanced database configuration options.

8. To customize the database names and/or paths, clear the setting to Hide advanced database configuration options and enter the relevant details. It is recommended these settings are only modified by advanced users. Click Next to continue.



Protege GX - InstallShield Wizard

Database Name

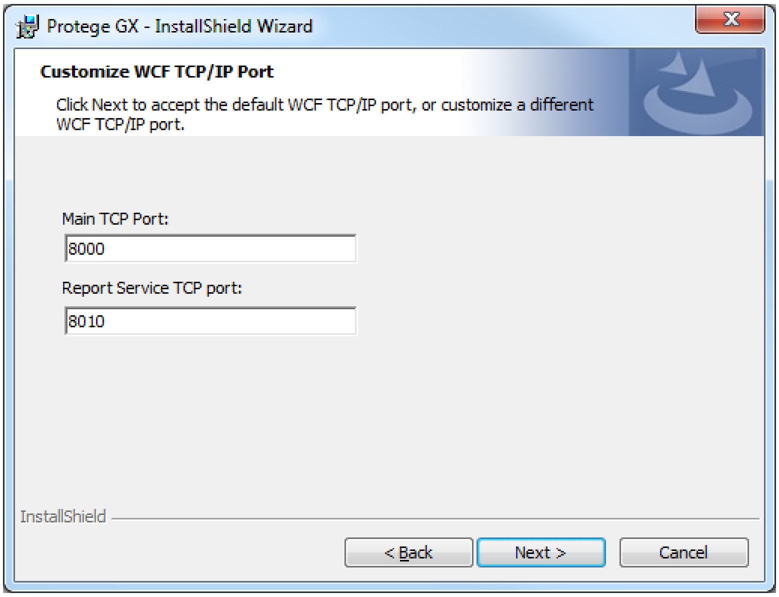
Click Next to accept the default database names, or customize the different database names.

☑ Customize the database names

Main database:
ProtegeGX_Acme

Event database:
ProtegeGXEvents_Acme

9. Click Next to use the default WCF TCP/IP port, or clear the option and enter a different port. This option should only be changed where another application on the target machine uses the default port as this would otherwise cause the services to fail to start.



Protege GX - InstallShield Wizard

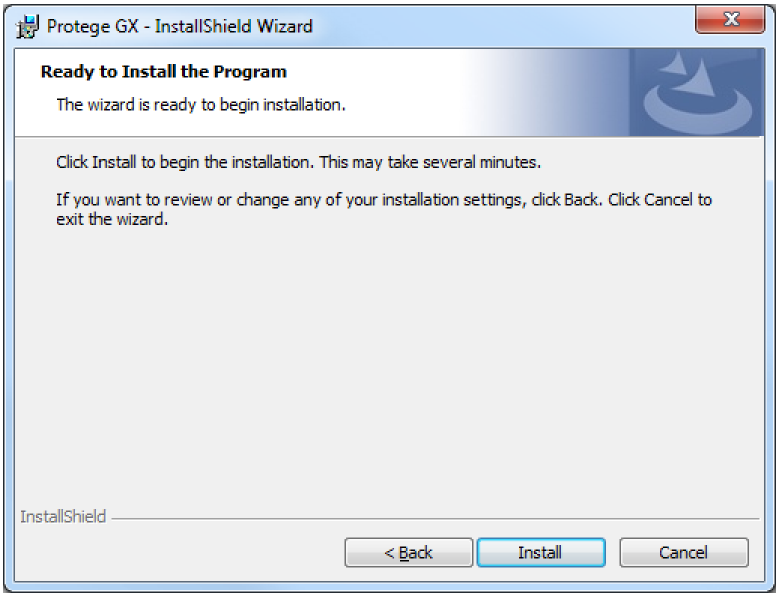
Customize WCF TCP/IP Port

Click Next to accept the default WCF TCP/IP port, or customize a different WCF TCP/IP port.

Main TCP Port:
8000

Report Service TCP port:
8010

10. Click **Install** to begin installation.



Protege GX - InstallShield Wizard

Ready to Install the Program

The wizard is ready to begin installation.

Click Install to begin the installation. This may take several minutes.

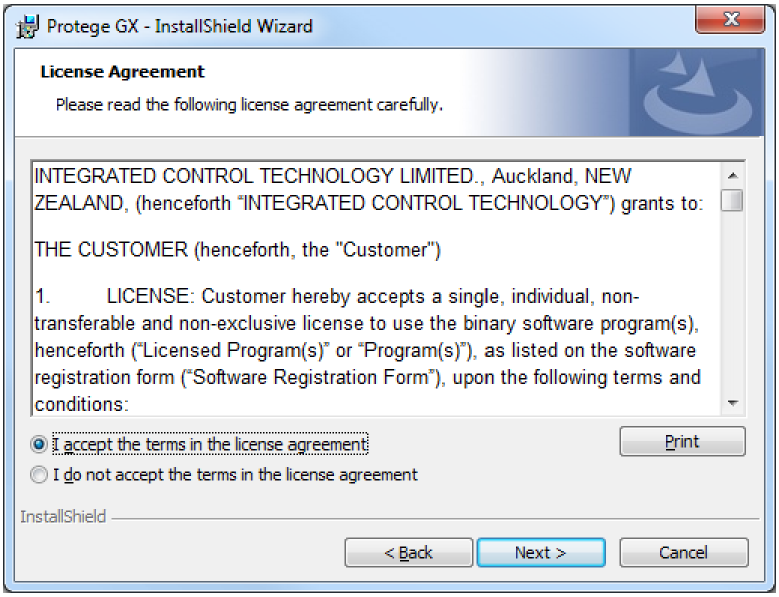
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

11. Progress is shown as the installation completes. Once complete, click **Finish** to exit the setup wizard.
12. You will be prompted to ensure that the Microsoft DirectX Runtime is installed (required if you are integrating with an OnSSI or Avigilon DVR system). This can be installed by running the DXSETUP located in the Microsoft DirectX Runtime for November 2008 folder

Installing the Protege GX Client on Remaining Operator Workstations

Once the Server installation is complete, the Protege GX client can be installed on the remaining operator workstations.

1. Run the supplied **setup.exe** to launch the Protege GX Install Wizard. Click **Next** to start the installation process.
2. Read and accept the License Agreement then click **Next** to continue.



Protege GX - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.

INTEGRATED CONTROL TECHNOLOGY LIMITED., Auckland, NEW ZEALAND, (henceforth "INTEGRATED CONTROL TECHNOLOGY") grants to:

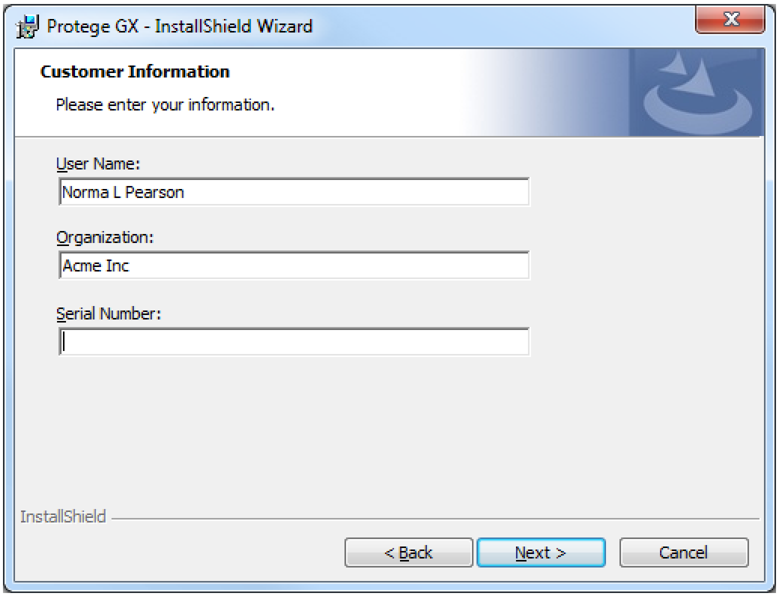
THE CUSTOMER (henceforth, the "Customer")

1. LICENSE: Customer hereby accepts a single, individual, non-transferable and non-exclusive license to use the binary software program(s), henceforth ("Licensed Program(s)" or "Program(s)"), as listed on the software registration form ("Software Registration Form"), upon the following terms and conditions:

● I accept the terms in the license agreement

○ I do not accept the terms in the license agreement

3. Enter your registration information including your name, company, and product serial number then click **Next** to continue.



Protege GX - InstallShield Wizard
Customer Information
Please enter your information.

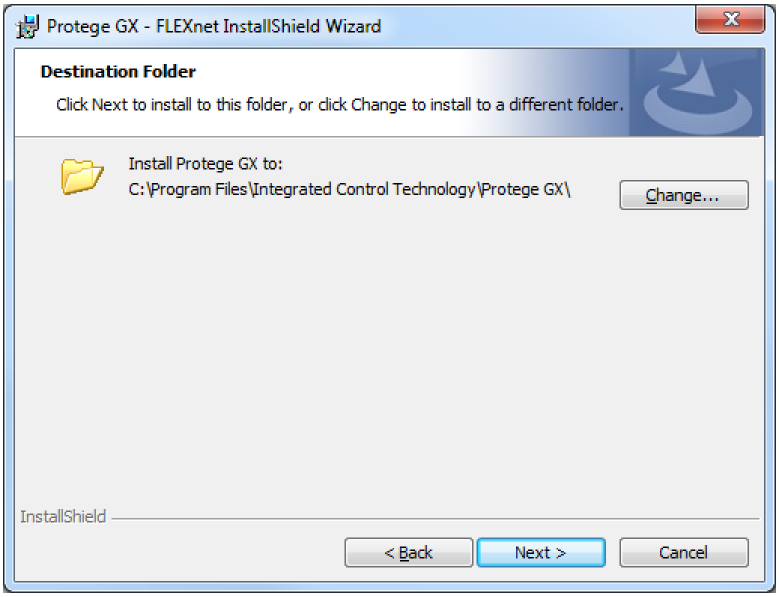
User Name: Norma L Pearson

Organization: Acme Inc

Serial Number:

InstallShield
< Back
Next >
Cancel

4. Click **Next** to install to the default folder or click **Change** to choose another location. We recommend accepting the default folder.



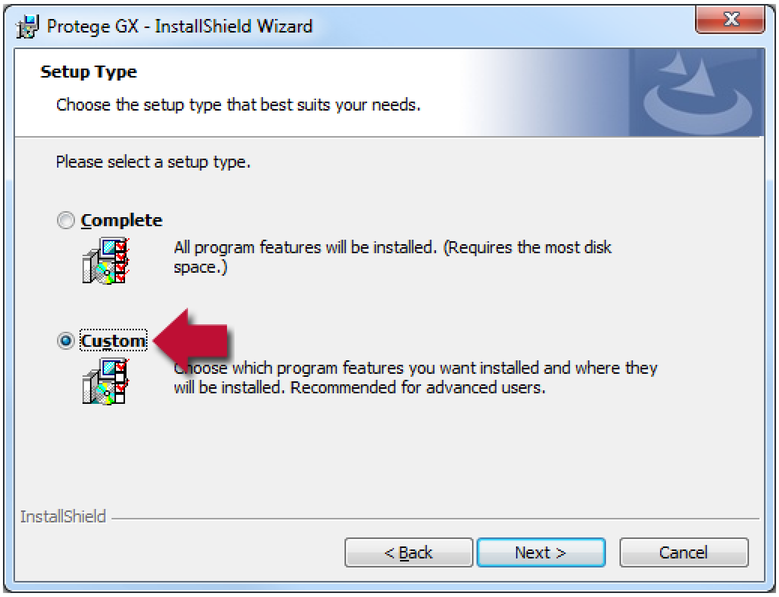
Protege GX - FLEXnet InstallShield Wizard

Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install Protege GX to:
C:\Program Files\Integrated Control Technology\Protege GX\

5. Select the **Custom** setup type and click **Next**. This enables you to select the program features that will be installed.



Protege GX - InstallShield Wizard

Setup Type

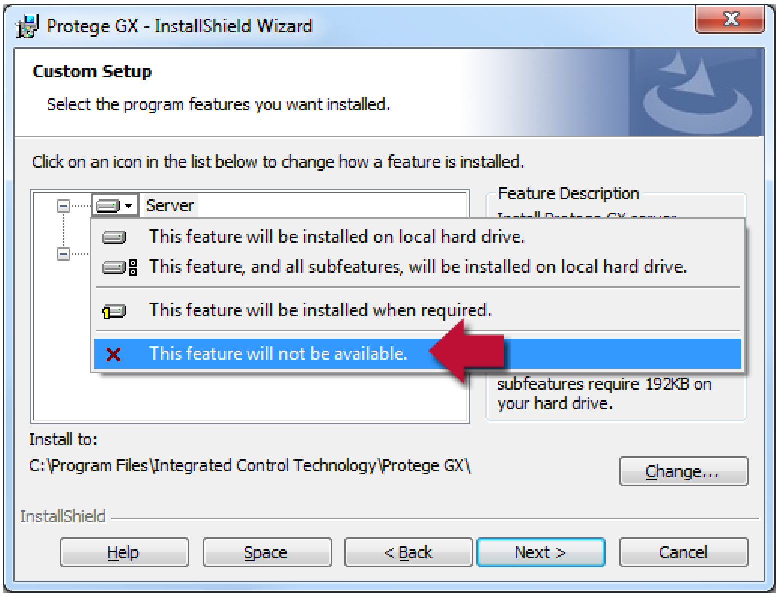
Choose the setup type that best suits your needs.

Please select a setup type.

○ **Complete**
All program features will be installed. (Requires the most disk space.)

● **Custom**
Choose which program features you want installed and where they will be installed. Recommended for advanced users.

6. Click the Server item and choose **This feature will not be available** from the options displayed. This removes the server components from the list of features to be installed. Click **Next** to continue.



Protege GX - InstallShield Wizard

Custom Setup

Select the program features you want installed.

Click on an icon in the list below to change how a feature is installed.

Server

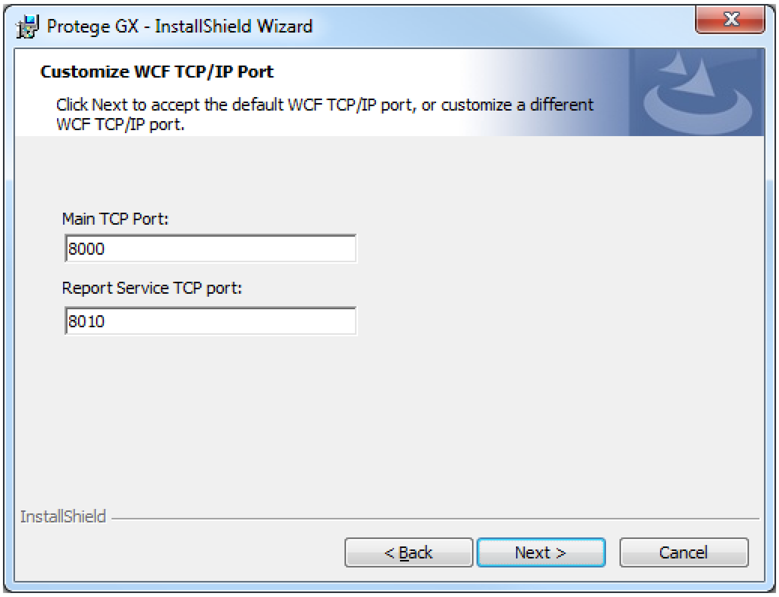
- This feature will be installed on local hard drive.
- This feature, and all subfeatures, will be installed on local hard drive.
- This feature will be installed when required.
- ✕ This feature will not be available.

Feature Description

subfeatures require 192KB on your hard drive.

Install to:
C:\Program Files\Integrated Control Technology\Protege GX\

7. Click **Next** to use the default WCF TCP/IP port, or clear the option and enter a different port. This option should only be changed where another application on the target machine uses the default port as this would otherwise cause the services to fail to start.



Protege GX - InstallShield Wizard

Customize WCF TCP/IP Port

Click Next to accept the default WCF TCP/IP port, or customize a different WCF TCP/IP port.

Main TCP Port: 8000

Report Service TCP port: 8010

8. Click **Install** to begin installation.

9. Progress is shown as the installation completes. Once complete, click **Finish** to exit the setup wizard.

Initial Site Configuration

Once the server and client components are installed, there's a few basic steps you need to take to get things setup.

1. Log In
2. Activate your license, and
3. Add a Site

You also need to add (and program) a Controller but we'll cover that later in the course.

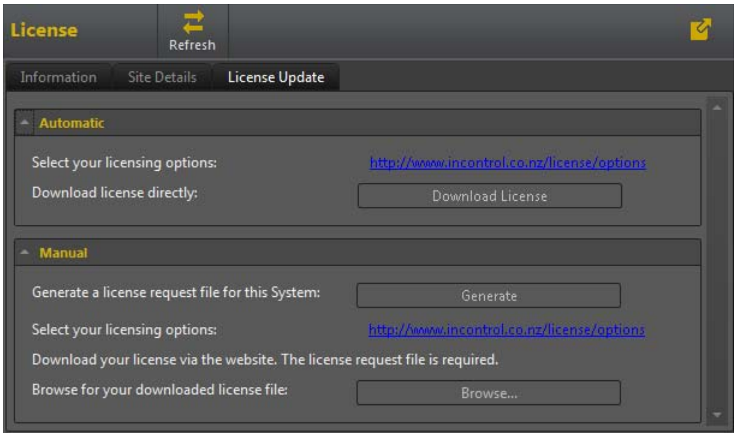
Step 1: Log In

Start Protege GX and login as a user with full access to the system. For new installations, this is admin with a blank password. For security reasons, this password should always be changed after the initial setup.

Step 2: Activate Your License

Before you can begin using Protege GX, you must register and activate your license. This procedure must be carried out from the server and not from a remote client workstation. You must also have local administrative privileges on the server in order to activate the license correctly.

1. From the main menu, select About > License
2. Select the License Update tab



Select your licensing options: http://www.incontrol.co.nz/license/options

Download license directly: Download License

Generate a license request file for this System: Generate

Select your licensing options: http://www.incontrol.co.nz/license/options

Download your license via the website. The license request file is required.

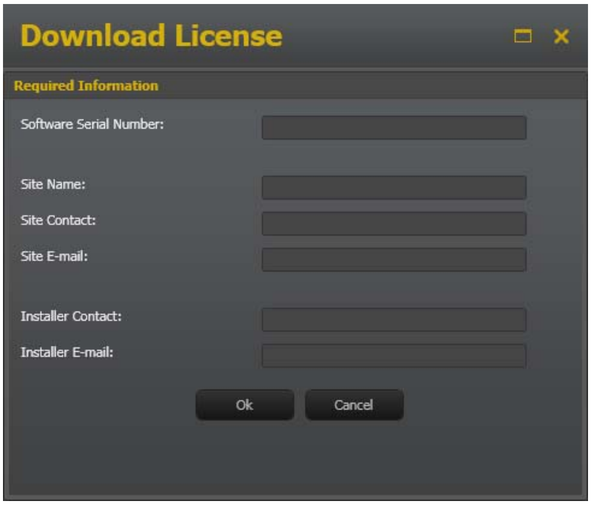
Browse for your downloaded license file: Browse...

3. Select the Automatic or Manual option to download and activate your Protege GX license.

Important: The activation process requires an Internet connection. If this is not available on the server, you will need to use the manual activation option, copy the license request to another machine or portable drive, and connect to the ICT website from a remote machine to download the license file. The downloaded license file must then be taken back to the server, and used to complete the activation process. The steps of generating the license and then adding it to Protege GX must be carried out from the server and not from a remote client workstation or the system profile will not match and license activation will fail.

To Automatically Activate Your License:

1. Click Download License, enter the required information and select OK.



2. The Protege application passes your details to the ICT web registration service, then activates your software automatically.

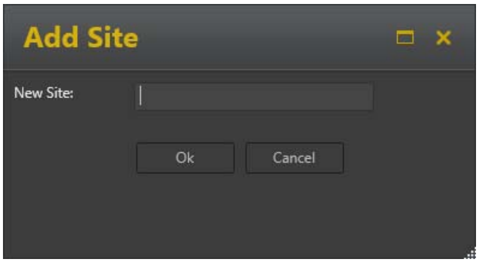
To Manually Activate Your License:

1. Click Generate to create a license request file. When prompted, save the ICT_LicenceRequest.req file to a folder on your network or a portable drive.
2. Click the link to Select your licensing options. This opens a webpage where you will be prompted to enter your Site, Installer, and SSN details.
3. Browse to the saved ICT_LicenceRequest.req file and click Submit.
4. Your details are passed to the ICT web registration service. Once registration is complete you will be prompted to download your license (*.lic) file.
5. Click Browse to select the license file and activate your Protege GX license.

Note: Steps 2 to 4 can be performed on any workstation with Internet access. Steps 1 and 5 must be performed on the server.

Step 3: Add a Site

When you login after activating your license and restarting the UI, you will be prompted to add a site:



Simply enter a name for your site - we suggest something meaningful - and click OK.

Review Questions

Which of the following operating systems are NOT supported for server installations?

□ Microsoft Windows XP SP3

□ Microsoft Windows Vista SP2

□ Microsoft Windows Server 2008 R2

□ All of the above systems are supported

Which database version is recommended?

□ SQL Server 2008 R2

□ MySQL Server Enterprise Edition

□ MySQL Server Express Edition

□ SQL Server 2005

What are the minimum CPU and RAM requirements for a Protege GX Server?

□ Intel Atom 1.66GHz, 2GB RAM

□ Intel Dual Core 2.8GHz, 4GB RAM

□ Intel Dual Quad 2.8GHz, 8GB RAM

□ Intel Xeon E5620, 2GB RAM

Module 129: Protege GX Software Introduction

This module describes the various services that make up the Protege GX Server and the functions they perform, provides an introduction to the user interface, and outlines the global settings that apply to the entire Protege system including all sites and all controllers.

In This Module

The Protege GX Services

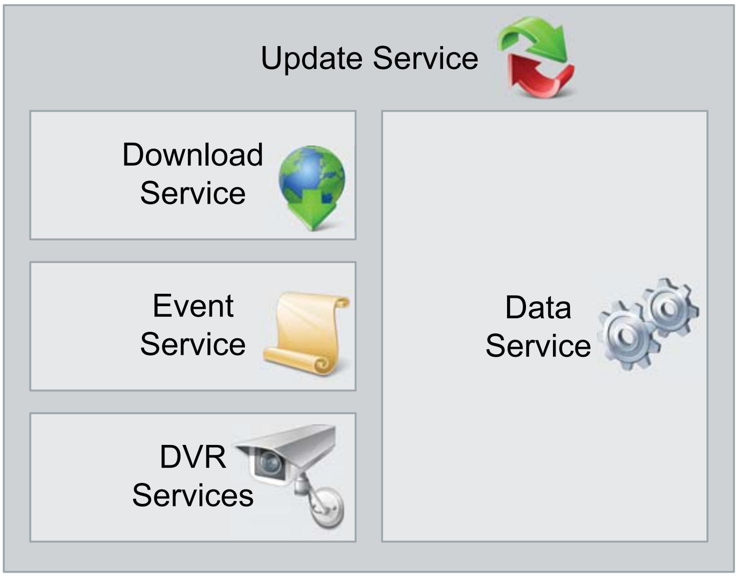
The Protege GX Server is made up of six different services:

- Protege GX Update Service
- Protege GX Data Service
- Protege GX Download Service
- Protege GX DVR Service A
- Protege GX DVR Service B
- Protege GX Event Service

Each service performs a different function within the system. It is important that you have a good understanding of what these services do, and more importantly, when to start or stop them.

Protege GX Update Service

The Update Service acts like the supervisor of all the other Protege GX services. It is also responsible for ensuring that the server license is valid.



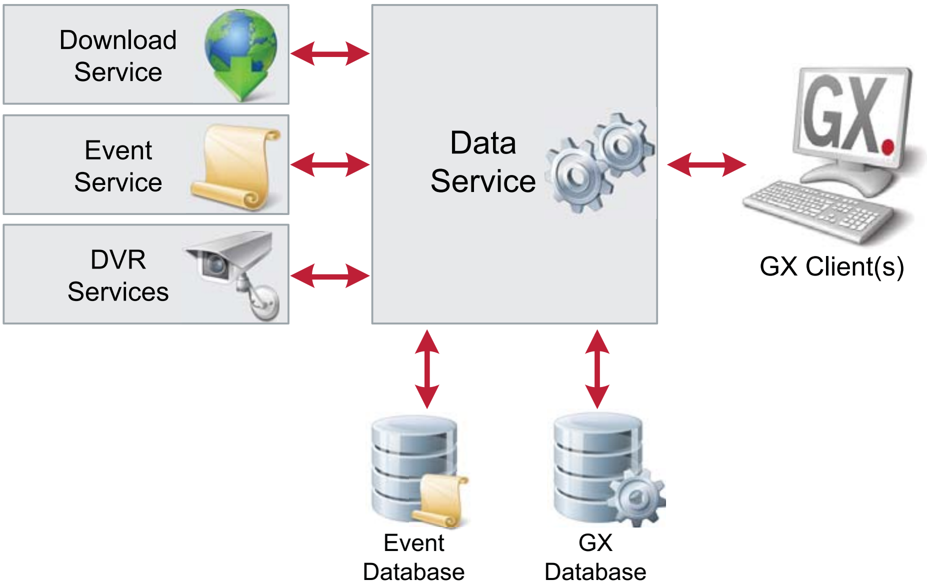
Stopping the Update Service will stop all other Protege GX services

- The Update Service should only ever be turned off during software upgrades or while the configuration database is being restored.
- If you need to stop all services, stop the Update Service. The system will then ask if you would like to stop the other critical Protege GX services.

Protege GX Data Service

The Data Service is responsible for:

- Communications between the Protege GX services
- Communications between the Protege GX server and the MS SQL databases
- Communications between the Protege GX client and Protege GX server



Stopping the Data Service

The Data Service is the central point for all communication, and cannot be stopped without adversely affecting the system. It must be running for the Protege GX server to function. Stopping the Data Service will take all GX clients offline, and prevent configuration changes and operator monitoring of the system.

Before stopping the Data Service, all clients should be shutdown. This ensures that all operators know that the system is about to be stopped, and that the client is logged in correctly once the Data Service is restarted.

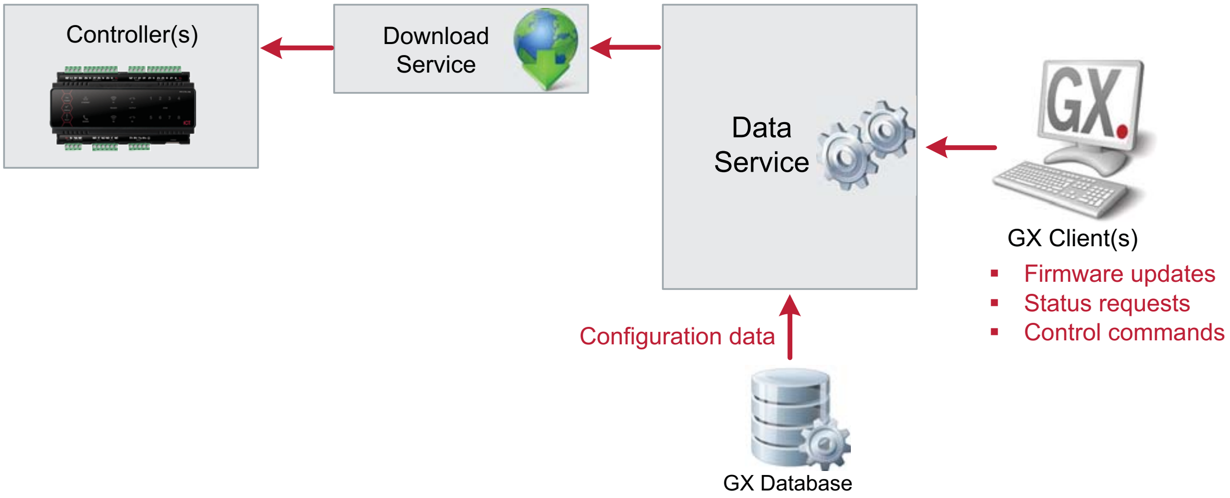
Starting the Data Service

When starting all services, such as after restoring a database or installing a software upgrade, start the Data Service first. The system will then automatically start the other critical Protege GX services, excluding the Download Service. The Download Service must be started manually once you are sure of the integrity of your system configuration database.

If the Protege GX Data Service fails to start, it is most likely due to a corrupt database or where a database that has been restored is a different version to that of the Protege GX server. Any errors encountered by the service are logged to the Windows Event Viewer.

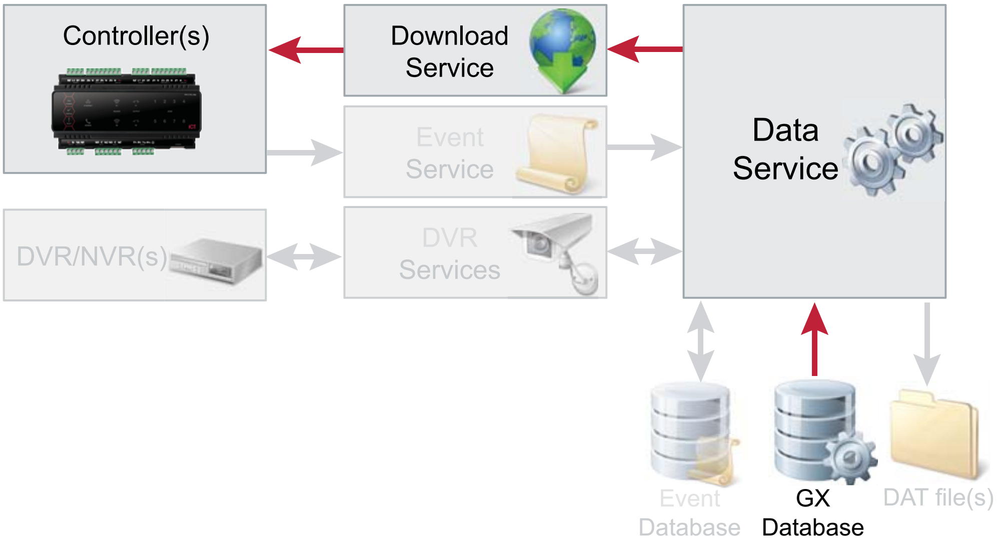
Protege GX Download Service

The Download Service is responsible for all outgoing messages and sends system configuration data, firmware updates, status requests and control commands from the server to the controllers.

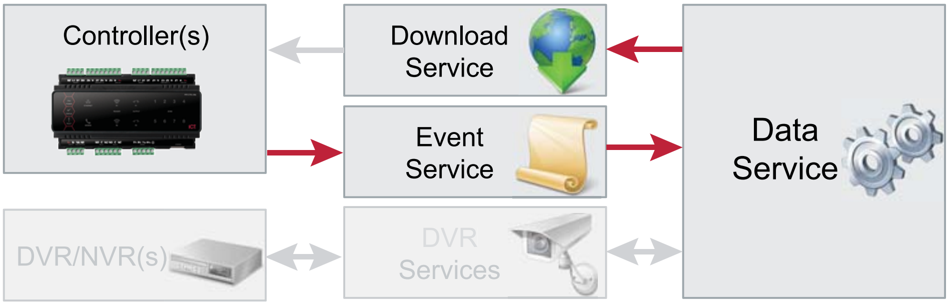


The Download Service can be stopped without adversely affecting the system. Stopping the Download Service will stop all outgoing messages to the controllers.

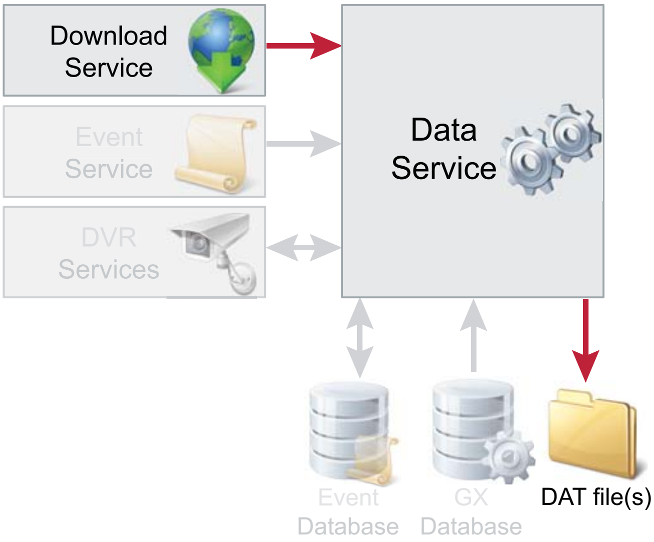
The Download Service periodically checks the configuration known to be stored in the controller and compares this with the current configuration in the GX database. If the two don't match, a new configuration is downloaded to the controller.



The Download Service is advised of a successful download by the controller. The controller sends this message to the Download Service via the Event Service and Data Service.



When the server successfully sends a new configuration to the controller, it writes a file to its local hard disk. This file contains only the current configuration of the controller.



If the Event Service is not working, the Download Service will never receive the message from the controller to say the download was successful and the DAT file will not be saved. This will result in the Download Service continuing to attempt a download to the controller.

The period that the Download Service compares the configurations is defined by the Download Retry Delay setting found under the Configuration tab of the Controller properties. By default, this is set to 60 seconds and means that when you make a change to the GX database using the client, it may take up to 60 seconds before the server starts to download the configuration. Depending on the type of controller you have, it can take another 5-60 seconds before the changes take effect.

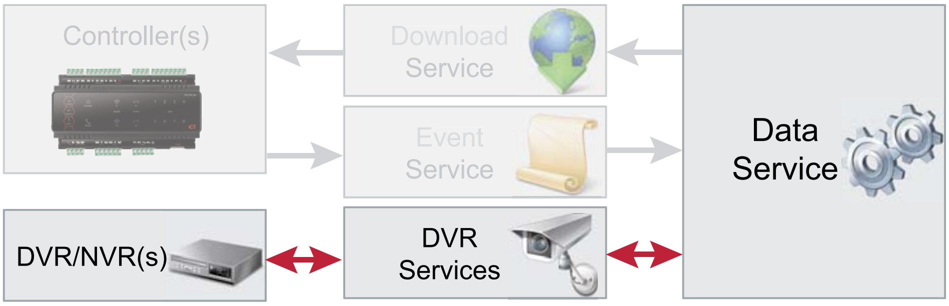
The Download Retry Delay should only be shortened while configuring a new controller. This allows configuration changes to be pushed out more frequently. Once the configuration is complete, the delay should be set back to the default of 60 seconds. This is especially important on systems with a large number of controllers, or on systems using higher cost data links to communicate with controllers. Using a larger delay and manually triggering a download when configuration changes are complete will mean less data is used.

The Download Service should be stopped when restoring a database and only restarted once you have checked that the configuration of the newly restored database is correct. The Download Service will then push out any configuration changes to the controllers.

By default the Download Service uses an outgoing port of 21000 for configuration and firmware downloads, and outgoing port of 21001 for status requests and control messages.

Protege GX DVR Services

There are two DVR services that are responsible for the interaction between Protege GX and integrated DVR/NVR systems.

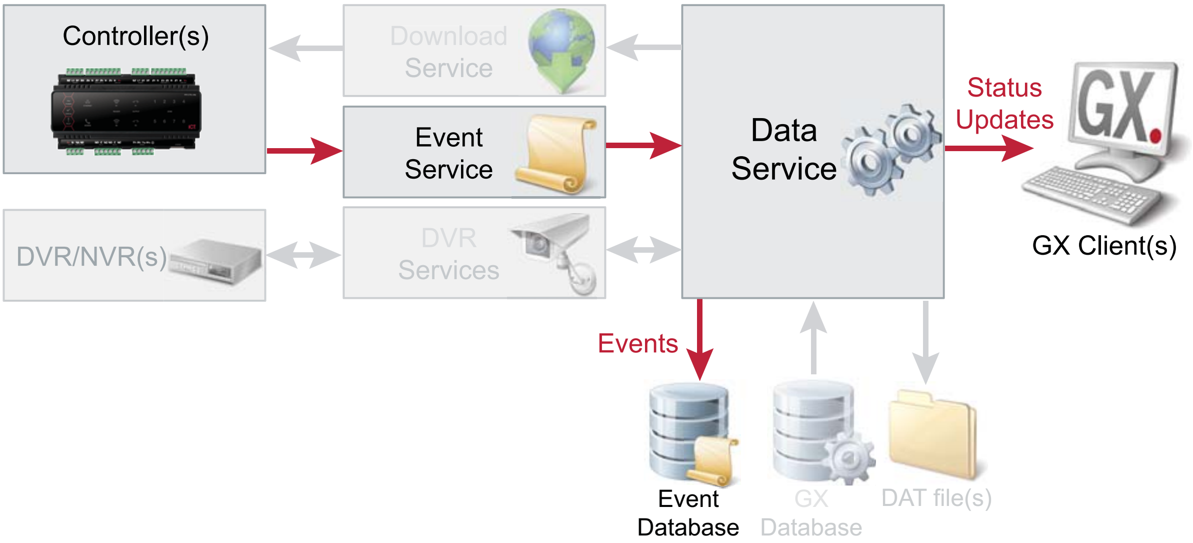


The DVR services can be stopped without adversely affecting the system. Stopping these services will stop events and control messages going from the Protege GX server to the DVR, and prevent the viewing of video within the Protege GX client.

Ports used by the DVR Services vary depending on the make and model of DVR. This is covered in more depth in a level 2 module.

Protege GX Event Service

The Event Service is responsible for all **incoming** messages from controllers. It receives events, status updates and other messages from controllers.



As the Event Service receives events, it passes them to the Data Service for processing, which in turn writes them into the Event database, and updates any clients requiring real-time information.

Stopping the Event Service

The Event Service can be stopped without adversely affecting the system. Stopping this service will prevent the server from receiving all messages from controllers.

If your site has operators actively monitoring the system, then they should be advised prior to stopping the service, as they will not receive any events, alarms or status updates while the service is offline.

Stopping the Event Service has no impact on the monitoring station reporting services already running on the controller, such as Contact ID or ArmorIP. These will continue to report offsite as long as their phone line or network connection remains intact.

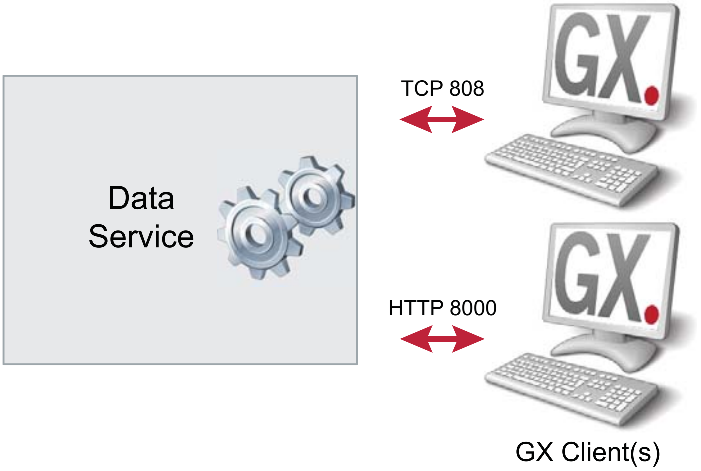
While the Event Service is offline, controllers will store events locally. When the service comes back online, the events are transmitted along with the time they actually occurred (field time). As GX Controllers can store a minimum of 2000 events onboard, the Event Service can be offline for a reasonably long time before any events are lost.

The Event Service uses a default incoming port of 22000.

Protege GX Client Communication

The GX Client communicates with the Data Service using the Windows Communication Foundation (WCF) default TCP port of 808 or HTTP port of 8000.

This can be set at the time of installation, but should only be changed if there is another program already installed on the Server which is also utilizing WCF communications on the default port.



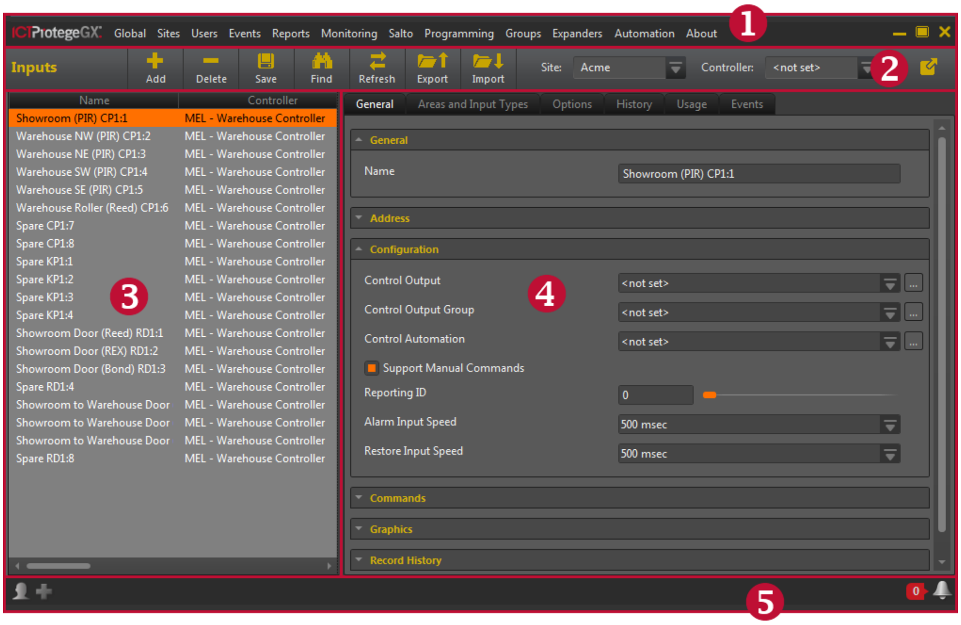
The Protege GX User Interface

The Protege GX user interface (or GX client) is used by operators to:

- Program the configuration database
- Receive live events and alarms from the server
- Receive video from DVR/NVR systems
- Send control commands to devices, such as opening doors remotely or controlling cameras
- Run reports

Programming changes made using the GX client are entered into the GX database by the Protege GX Data Service. The Download Service then pushes these changes out to the applicable controllers on the next download cycle.

The Protege GX interface is divided into five main areas:



Site: Acme

Controller: <not set>

Name	Controller
Showroom (PIR) CP1:1	MEL - Warehouse Controller
Warehouse NW (PIR) CP1:2	MEL - Warehouse Controller
Warehouse NE (PIR) CP1:3	MEL - Warehouse Controller
Warehouse SW (PIR) CP1:4	MEL - Warehouse Controller
Warehouse SE (PIR) CP1:5	MEL - Warehouse Controller
Warehouse Roller (Reed) CP1:6	MEL - Warehouse Controller
Spare CP1:7	MEL - Warehouse Controller
Spare CP1:8	MEL - Warehouse Controller
Spare KP1:1	MEL - Warehouse Controller
Spare KP1:2	MEL - Warehouse Controller
Spare KP1:3	MEL - Warehouse Controller
Spare KP1:4	MEL - Warehouse Controller
Showroom Door (Reed) RD1:1	MEL - Warehouse Controller
Showroom Door (REX) RD1:2	MEL - Warehouse Controller
Showroom Door (Bond) RD1:3	MEL - Warehouse Controller
Spare RD1:4	MEL - Warehouse Controller
Showroom to Warehouse Door	MEL - Warehouse Controller
Showroom to Warehouse Door	MEL - Warehouse Controller
Showroom to Warehouse Door	MEL - Warehouse Controller
Spare RD1:8	MEL - Warehouse Controller

Name: Showroom (PIR) CP1:1

Control Output: <not set>

Control Output Group: <not set>

Control Automation: <not set>

☑ Support Manual Commands

Reporting ID: 0

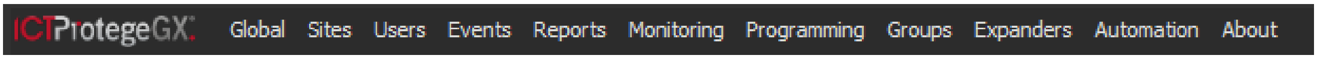
Alarm Input Speed: 500 msec

Restore Input Speed: 500 msec

1. Main Toolbar
2. Toolbar
3. Record List
4. Programming Window
5. Status Bar

Main Menu

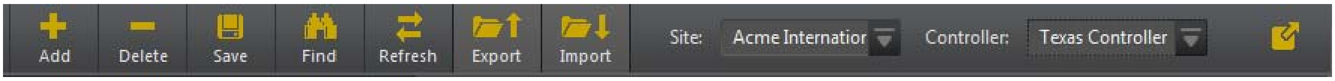
The Main Menu provides complete access to all program functions and is designed to help you quickly find the commands that you need by organizing commands in logical groups.



- The **Global** menu contains settings that apply to the entire system, such as server and database configuration, operators and roles and system wide display options
- The **Sites** menu contains items that are applicable across a whole site, such as schedules and holidays, controllers, and other site-wide configuration
- The **Users** menu contains functions related directly to users, such as user configuration, access levels and card templates
- The **Events** menu contains functions used to create event filters, define alarms, and configure how events and alarms are handled
- The **Reports** menu takes the events and turns them into something useful for operators, such as event reports and user reports
- The **Monitoring** menu contains configuration of the items used by operators monitoring the system, including status pages, floor plans and cameras
- The **Programming** menu includes functions for configuring items at the edge of the system, such as doors, inputs and output, areas, and elevators
- Groups provide an effective way of grouping functions together and assigning them to an access level. Functions for creating and editing groups are all found under the **Groups** menu.
- The **Expanders** menu contains the settings required to configure the physical hardware connected to your system
- The **Automation** menu contains functions relating to automation and intelligent control. This is covered in a level 2 module
- The **About** menu is used to view version information, licensing and online help

Toolbar

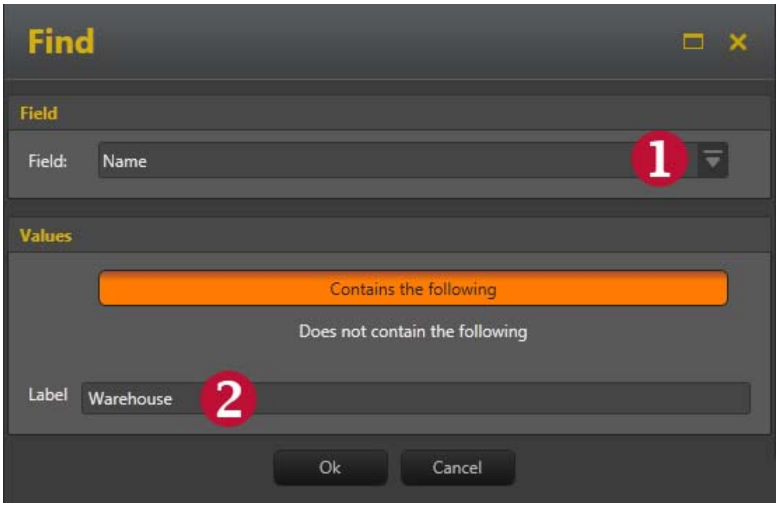
The Toolbar remains consistent throughout the Protege GX User Interface. Once you know what a button does, it has the same functionality throughout the software:



- Add: Adds a new record to the database. The new record isn't added until you save it.
- Delete: Removes the selected record(s) from the database. Where a record has links to other records (such as an Expander with links to Inputs), you'll be prompted to remove these records too
- Save: Saves the selected record to the database. Any changes made are sent by the Download Server to the applicable controllers on the next download cycle.
- Find: Opens a Find dialog to search for a particular record or records.
- Refresh: Refreshes the Record List by reloading the records from the database.
- Export: Provides a quick and easy way of taking data out of your system and using it elsewhere.
- Import: Takes the configuration from another record and copies it to the currently selected record. This can be used to clone the configuration of an existing item.
- Site: Used to quickly switch between multiple sites.
- Controller: Allows the operator to change the controller currently selected.

Find

Use the Find button to search for particular record(s)



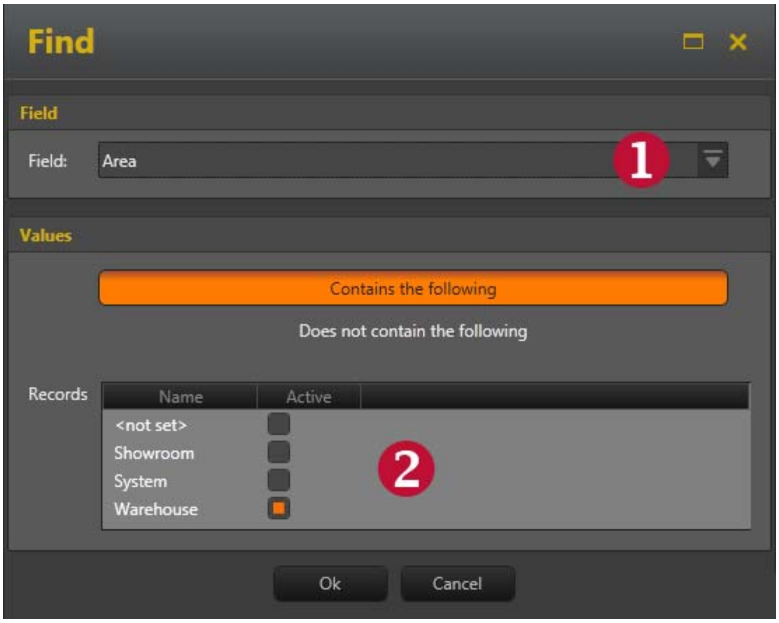
Field: Name

Label Warehouse

1. Choose the Field to search across
2. Enter the text string (label) to look for and click OK

   The Record List is filtered to display only the records that match the text entered.

The Find tool can also be used to filter records of a specific type. For example, to find all inputs in a particular Area:



Field: Area

Name	Active
<not set>	☐
Showroom	☐
System	☐
Warehouse	☑

1. Select the Area from the field options
2. Choose the specific Area(s) you want to search from the records shown and click OK

   The Record List is filtered to display only the inputs from the selected Area.

The Find tool works on the records that are currently displayed. This means that if you filter your records using the find tool then run the Find a second time, the action is only performed on the results from the first Find action. To perform a new search, click the Refresh button to reset the list first

Refresh

Clicking the **Refresh** button will reload the records that are displayed in the Record List

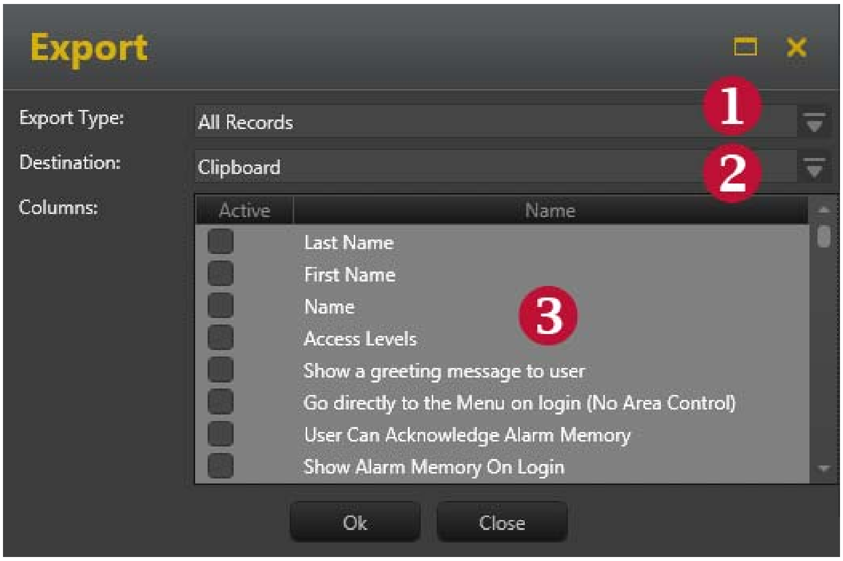
Use the Refresh button in the following circumstances:

- To clear the filtered results when using the Find tool
- To update data when a second client window has been used to configure something

  For example, if you are configuring something that requires an Area to be selected and you use the ellipsis button to open another window to create a new Area, you will need to click the Refresh button in the original window for the new Area to be displayed
- To update data when another operator may have made changes to the same record

Export

The Export tool provides a quick and easy way of taking data out of your system and using it elsewhere. For example, you can use this to create a list of Doors to include in your routine maintenance check sheets, or to create a list of users to be emailed to someone.



Export

Export Type: All Records

Destination: Clipboard

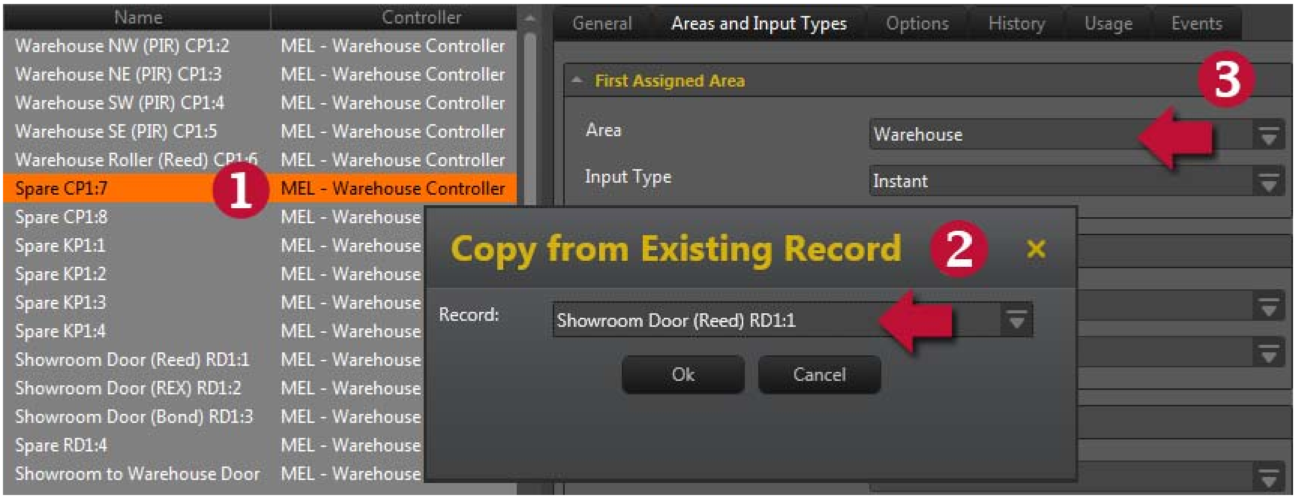
Columns:

Active	Name
□	Last Name
□	First Name
□	Name
□	Access Levels
□	Show a greeting message to user
□	Go directly to the Menu on login (No Area Control)
□	User Can Acknowledge Alarm Memory
□	Show Alarm Memory On Login

1. Select the Export Type. If you haven't selected any records, the Export Type is set to **All Records** and the entire Record List will be exported. If you selected specific records in the Record List, the Export Type is set to **Selected Records** and only those items will be exported.
2. Choose the Destination. Use **Clipboard** if you intend to paste the results into an email or document, or **File** if you want to create a CSV file to use the data in an Excel spreadsheet or similar.
3. Select the columns you want to export and click OK. To export everything, select one column then use CTRL+A to select the rest.

Import

The Import tool takes the configuration values from one record and copies it to another. This can be used to clone the configuration of an existing item.



Name	Controller
Warehouse NW (PIR) CP1:2	MEL - Warehouse Controller
Warehouse NE (PIR) CP1:3	MEL - Warehouse Controller
Warehouse SW (PIR) CP1:4	MEL - Warehouse Controller
Warehouse SE (PIR) CP1:5	MEL - Warehouse Controller
Warehouse Roller (Reed) CP1:6	MEL - Warehouse Controller
Spare CP1:7	MEL - Warehouse Controller
Spare CP1:8	MEL - Warehouse
Spare KP1:1	MEL - Warehouse
Spare KP1:2	MEL - Warehouse
Spare KP1:3	MEL - Warehouse
Spare KP1:4	MEL - Warehouse
Showroom Door (Reed) RD1:1	MEL - Warehouse
Showroom Door (REX) RD1:2	MEL - Warehouse
Showroom Door (Bond) RD1:3	MEL - Warehouse
Spare RD1:4	MEL - Warehouse
Showroom to Warehouse Door	MEL - Warehouse

First Assigned Area

Area: Warehouse

Input Type: Instant

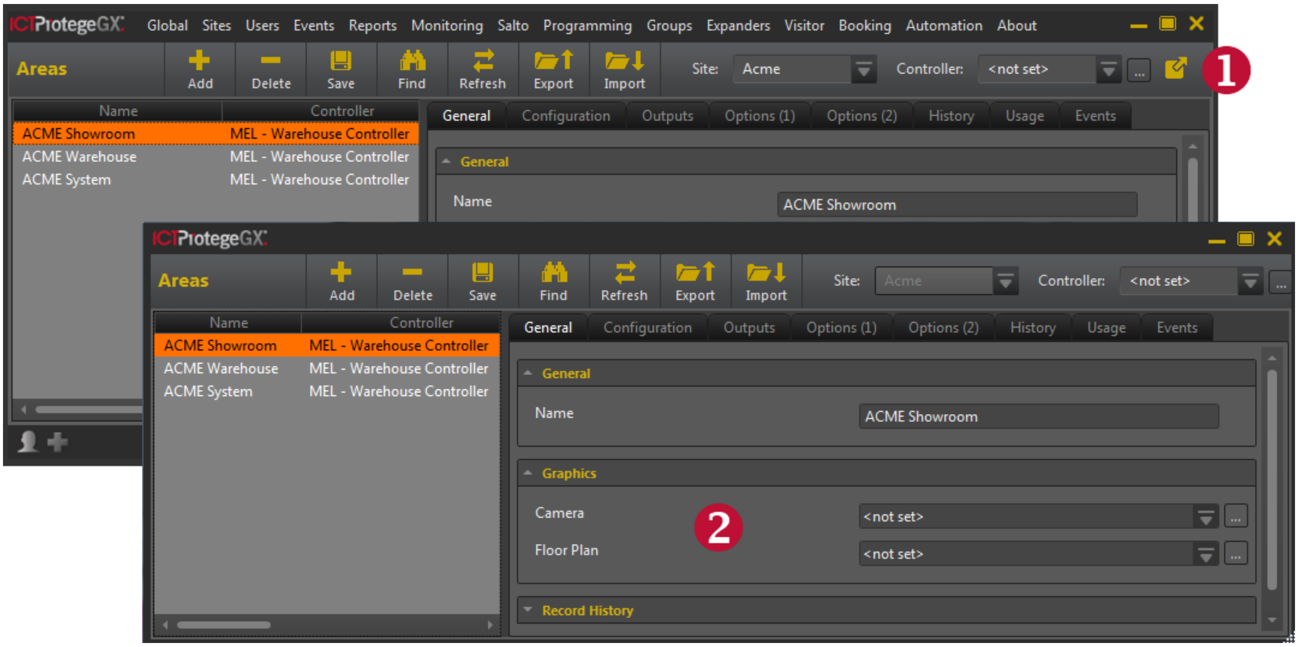
Copy from Existing Record

Record: Showroom Door (Reed) RD1:1

1. Select the item that you wish to copy the configuration values **to** and click Import
2. Choose the existing item to copy data **from** and click OK
3. The settings are updated to match those of the existing record

Breakout Button

Use the Breakout button to open the current page in another window. You can then navigate to a different page in the primary window. This is particularly useful when you have two monitors.



Name	Controller
ACME Showroom	MEL - Warehouse Controller
ACME Warehouse	MEL - Warehouse Controller
ACME System	MEL - Warehouse Controller

Site: Acme

Controller: <not set>

General

Name: ACME Showroom

Graphics

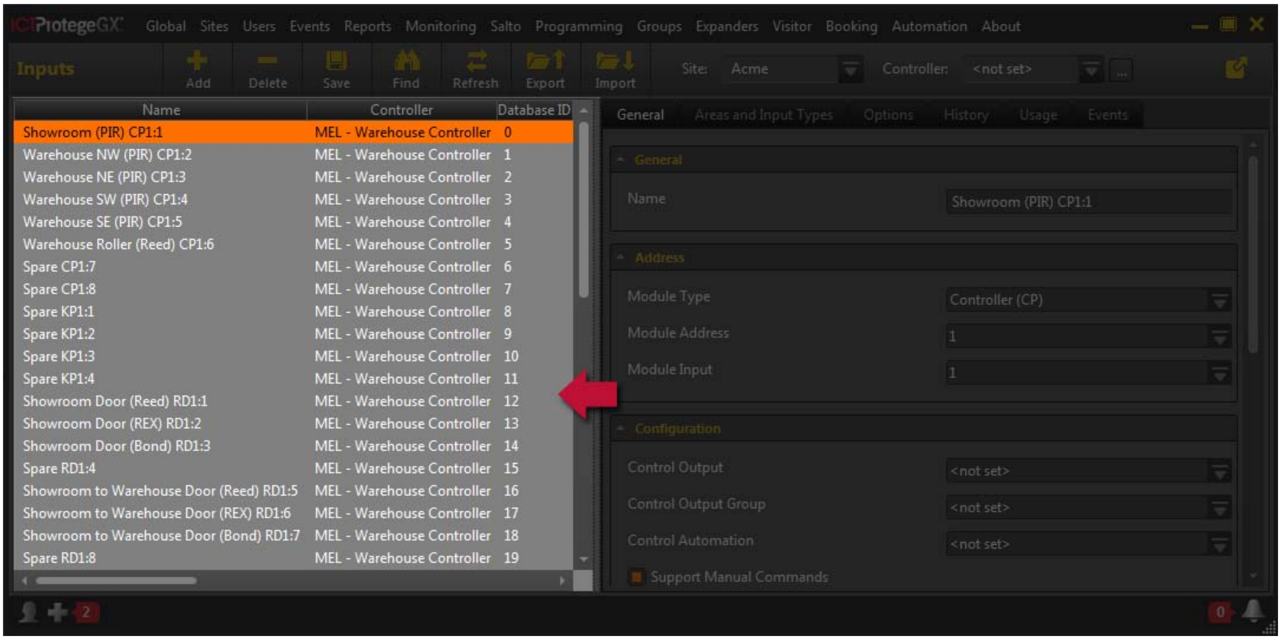
Camera: <not set>

Floor Plan: <not set>

Record History

The Record List

The Record list is the panel shown on the left of the screen and is used to display a list of records within the current database. For example, when programming Inputs, the Record List displays a list of all Inputs that are currently programmed.



Site: Acme

Controller: <not set>

Name	Controller	Database ID
Showroom (PIR) CP1:1	MEL - Warehouse Controller	0
Warehouse NW (PIR) CP1:2	MEL - Warehouse Controller	1
Warehouse NE (PIR) CP1:3	MEL - Warehouse Controller	2
Warehouse SW (PIR) CP1:4	MEL - Warehouse Controller	3
Warehouse SE (PIR) CP1:5	MEL - Warehouse Controller	4
Warehouse Roller (Reed) CP1:6	MEL - Warehouse Controller	5
Spare CP1:7	MEL - Warehouse Controller	6
Spare CP1:8	MEL - Warehouse Controller	7
Spare KP1:1	MEL - Warehouse Controller	8
Spare KP1:2	MEL - Warehouse Controller	9
Spare KP1:3	MEL - Warehouse Controller	10
Spare KP1:4	MEL - Warehouse Controller	11
Showroom Door (Reed) RD1:1	MEL - Warehouse Controller	12
Showroom Door (REX) RD1:2	MEL - Warehouse Controller	13
Showroom Door (Bond) RD1:3	MEL - Warehouse Controller	14
Spare RD1:4	MEL - Warehouse Controller	15
Showroom to Warehouse Door (Reed) RD1:5	MEL - Warehouse Controller	16
Showroom to Warehouse Door (REX) RD1:6	MEL - Warehouse Controller	17
Showroom to Warehouse Door (Bond) RD1:7	MEL - Warehouse Controller	18
Spare RD1:8	MEL - Warehouse Controller	19

General

Name: Showroom (PIR) CP1:1

Address

Module Type: Controller (CP)

Module Address: 1

Module Input: 1

Configuration

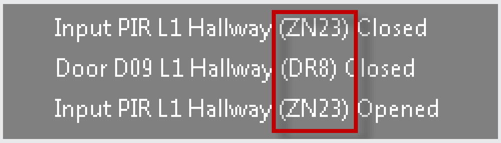
Control Output: <not set>

Control Output Group: <not set>

Control Automation: <not set>

■ Support Manual Commands

The Record list contains one or more of the following columns:

Column	Description
Name	The primary language name given to the record.
Controller	The name of the Controller that the record belongs to.
Database ID	This is the **Database ID**. It is a unique ID across the whole system and is used to identify the record in the event log. For example, the event log below shows an input identified as (ZN23). This means it has a database address of 23 and has no relation to the physical input number on the Input Expander.  Input PIR L1 Hallway (ZN23) Closed Door D09 L1 Hallway (DR8) Closed Input PIR L1 Hallway (ZN23) Opened
Module Type	Identifies the type of module this record belongs to. For example, if the module type is shown as Controller, the record is physically connected to a Controller.
Module Address	Identifies the **hardware address** of the module the record belongs to. For example, if the record has a Module Address of 1, it refers to the hardware expander that is physically addressed as Module 1.
Module Input/Output	Identifies the **hardware position** of the device this record is configuring. For example, if the record has a Module Input of 1, it refers to input number 1 on the physical hardware device.
Created Date	The date and time that this record was first created.
Last Modified	The date and time that this record was last modified.
Last Modified By	The operator that made the last modification to this record.

The Record List can be sorted, resized and reordered to suit.

- Sort the record list by clicking on a column header. For example, to sort alphabetically by record name, click the Name column. Click the column header again to sort in reverse order.
- Resize columns by hovering your mouse over the edge of the column header until it forms a double-headed arrow ↔ then dragging the column to the required size. Alternatively, you can double click between the column headers to automatically resize the column to its optimum width.
- Reorder columns by dragging and dropping a column header to a new position in the list.

If you want to quickly see the differences between records, click and hold on a record, then drag up or down the record list. As your mouse moves over a new record, the details are updated in the programming window.

Selecting Multiple Records

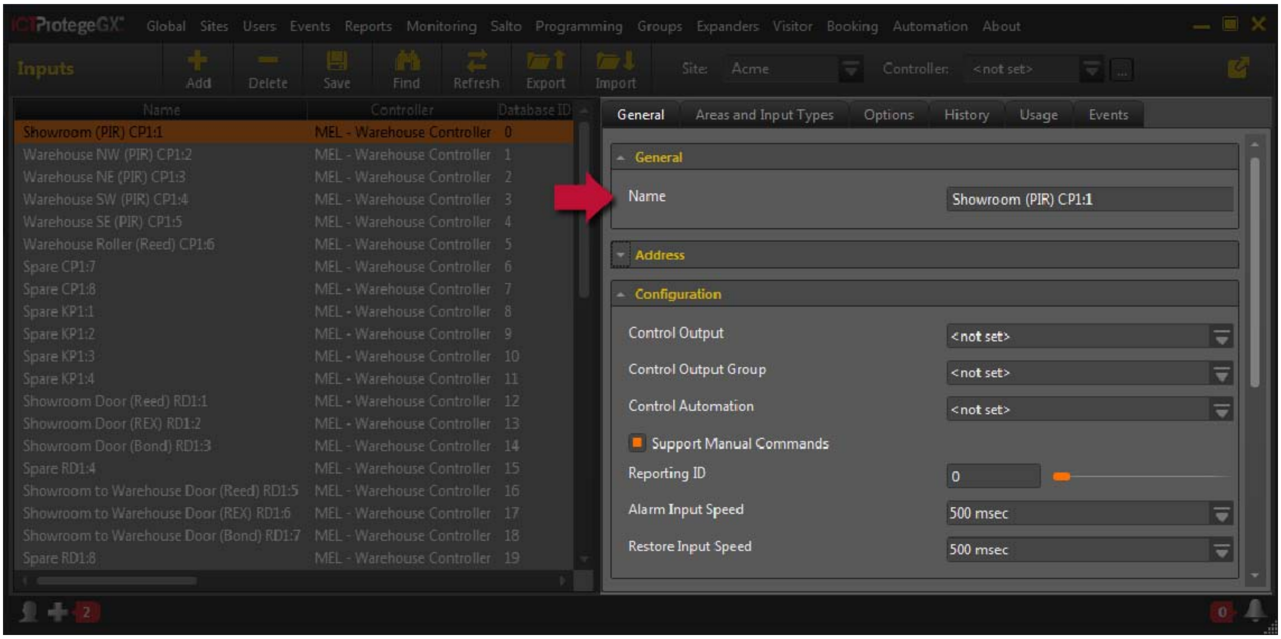
Use the standard Windows shortcuts for selecting multiple records at once. This is useful if you want to delete or export a large number of records, or if you want to configure a number of records to have the same settings.

- To select a group of consecutive records, click the first record, and then hold down SHIFT and click the last record
- To select a group of non-consecutive records, click the first record, then hold down CTRL and click the additional records you want
- You can also use CTRL + A to select all records at once
- You can also use a combination of these methods to speed up your selection process. For example, use CTRL + A to select all records, then hold the CTRL key and click on the records you don't want.

Once you have a group of records selected, you can perform a group operation, such as assigning an Area and Input Type to a group of Inputs.

The Programming Window

The Programming Window is where the system configuration is programmed. Selecting a record from the Record List will populate the Programming Window with the configuration details for that record.



Site: Acme

Controller: <not set>

Name	Controller	Database ID
Showroom (PIR) CP1:1	MEL - Warehouse Controller	0
Warehouse NW (PIR) CP1:2	MEL - Warehouse Controller	1
Warehouse NE (PIR) CP1:3	MEL - Warehouse Controller	2
Warehouse SW (PIR) CP1:4	MEL - Warehouse Controller	3
Warehouse SE (PIR) CP1:5	MEL - Warehouse Controller	4
Warehouse Roller (Reed) CP1:6	MEL - Warehouse Controller	5
Spare CP1:7	MEL - Warehouse Controller	6
Spare CP1:8	MEL - Warehouse Controller	7
Spare KP1:1	MEL - Warehouse Controller	8
Spare KP1:2	MEL - Warehouse Controller	9
Spare KP1:3	MEL - Warehouse Controller	10
Spare KP1:4	MEL - Warehouse Controller	11
Showroom Door (Reed) RD1:1	MEL - Warehouse Controller	12
Showroom Door (REX) RD1:2	MEL - Warehouse Controller	13
Showroom Door (Bond) RD1:3	MEL - Warehouse Controller	14
Spare RD1:4	MEL - Warehouse Controller	15
Showroom to Warehouse Door (Reed) RD1:5	MEL - Warehouse Controller	16
Showroom to Warehouse Door (REX) RD1:6	MEL - Warehouse Controller	17
Showroom to Warehouse Door (Bond) RD1:7	MEL - Warehouse Controller	18
Spare RD1:8	MEL - Warehouse Controller	19

General

Name: Showroom (PIR) CP1:1

Address

Configuration

Control Output: <not set>

Control Output Group: <not set>

Control Automation: <not set>

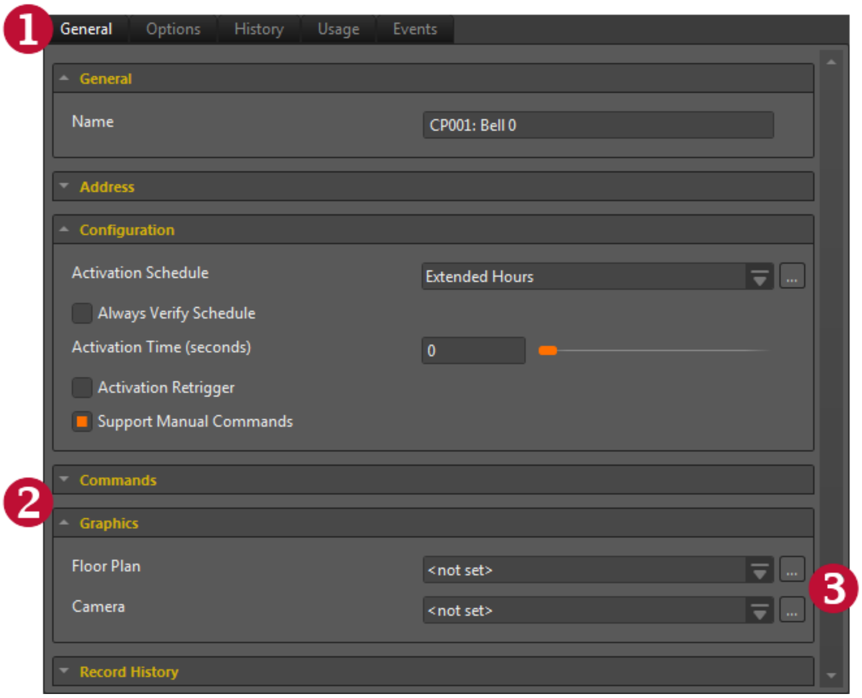
☑ Support Manual Commands

Reporting ID: 0

Alarm Input Speed: 500 msec

Restore Input Speed: 500 msec

1. The Programming Window typically contains a number tabs, with similar configuration items grouped together. The General tab always contains the name of the record as well as the most common or important items to be configured.



Name: CP001: Bell 0

Activation Schedule: Extended Hours

□ Always Verify Schedule

Activation Time (seconds): 0

□ Activation Retrigger

☑ Support Manual Commands

Floor Plan: <not set>

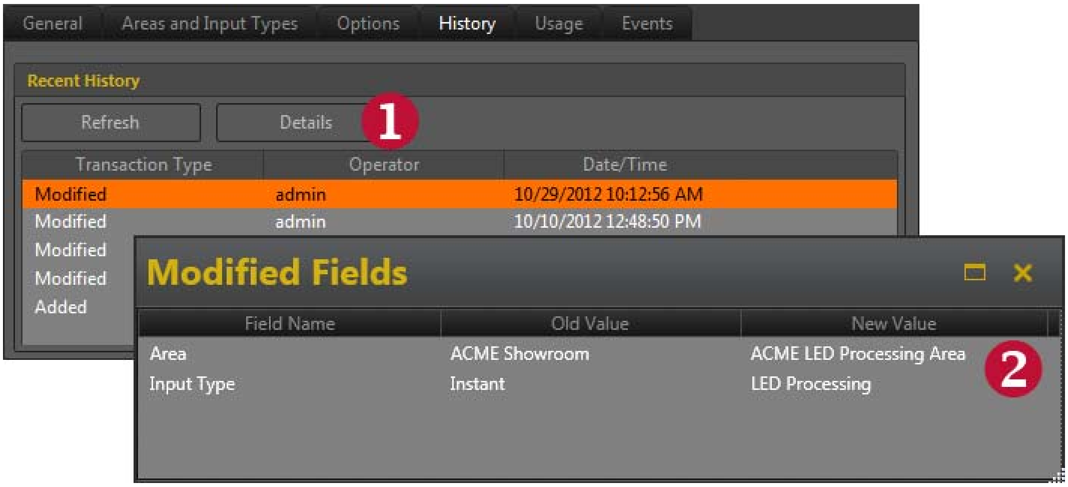
Camera: <not set>

2. Use the up ▲ and down ▼ arrows to collapse/expand the groups. This is particularly useful when using a low screen resolution.

3. Items that require you to select other configurable records have an ellipsis button that opens a second window. This allows you to configure the appropriate record without navigating away from the current programming window.

Viewing History

The History tab contains a list of every modification that has occurred to a record. This includes the date and time it was modified, and which operator made the modification.



Transaction Type	Operator	Date/Time
Modified	admin	10/29/2012 10:12:56 AM
Modified	admin	10/10/2012 12:48:50 PM
Modified		
Modified		
Added		

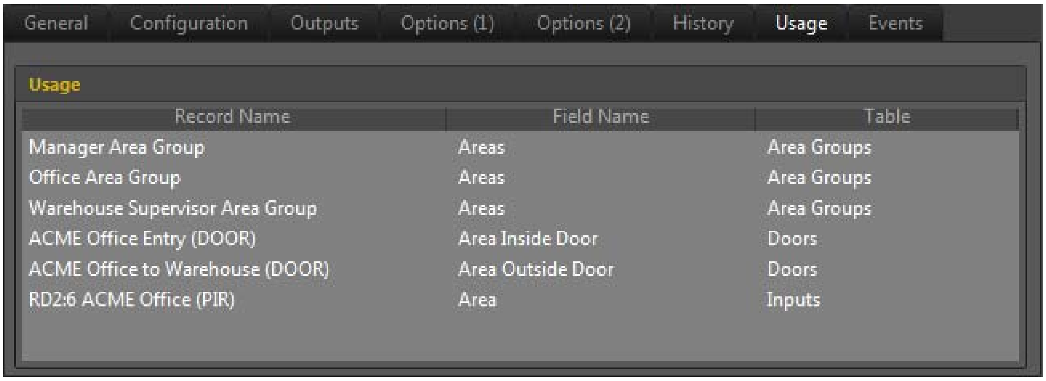
Field Name	Old Value	New Value
Area	ACME Showroom	ACME LED Processing Area
Input Type	Instant	LED Processing

1. Click the Details button to show the fields that have been modified and the old/new values.

2. This provides a full audit trail so previous settings can easily be restored if a programming error is made.

Viewing Usage

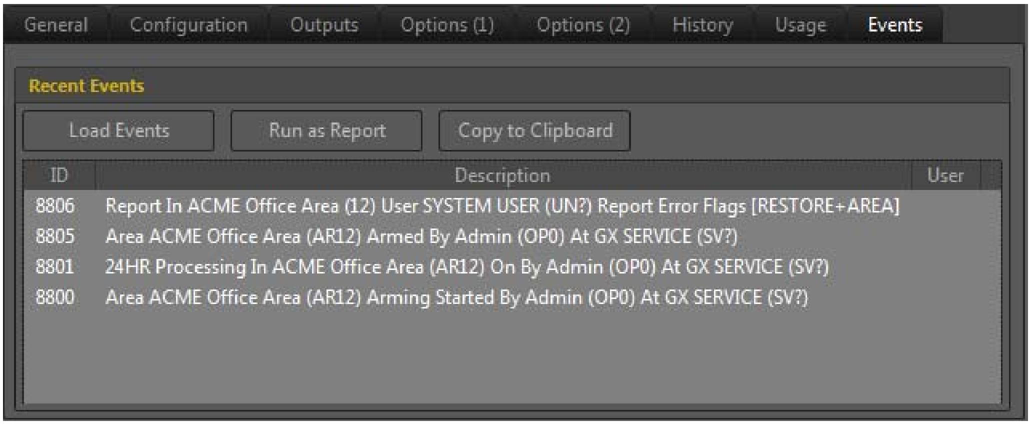
The Usage tab shows other records that rely on the record currently displayed.



Record Name	Field Name	Table
Manager Area Group	Areas	Area Groups
Office Area Group	Areas	Area Groups
Warehouse Supervisor Area Group	Areas	Area Groups
ACME Office Entry (DOOR)	Area Inside Door	Doors
ACME Office to Warehouse (DOOR)	Area Outside Door	Doors
RD2:6 ACME Office (PIR)	Area	Inputs

Viewing Events

The Events tab provides an easy way to find information about a record.

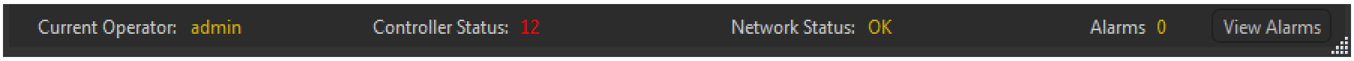


ID	Description	User
8806	Report In ACME Office Area (12) User SYSTEM USER (UN?) Report Error Flags [RESTORE+AREA]	
8805	Area ACME Office Area (AR12) Armed By Admin (OP0) At GX SERVICE (SV?)	
8801	24HR Processing In ACME Office Area (AR12) On By Admin (OP0) At GX SERVICE (SV?)	
8800	Area ACME Office Area (AR12) Arming Started By Admin (OP0) At GX SERVICE (SV?)	

- Click Load Events to display all events for the current record
- Click Run as Report to generate a report of these events that can be printed, exported in multiple formats or emailed directly from the application
- Use Copy to Clipboard if you want to quickly paste the events into an email or other document

The Status Bar

The status bar provides general information about the system, regardless of where you are in the software.



Item	Description
Current Operator	The name of the operator that is currently logged in
Controller Status	The current status of the controller. Shown as OK when all controllers are online and there are no health warnings. Displays a number (in red) to indicate a configuration problem (such as a component requiring a module update). Use the Health Status to check for issues.
Network Status	The current network status
Alarms	The total number of alarms present in the system requiring acknowledgement
View Alarms	A quick link button that opens the Alarm Status Page defined for the site

Global Settings

Global settings apply to the entire Protege system - including all sites and all controllers. They define such things as:

- The user name format
- How long event records are stored
- The backup settings

They also define email, display, and sound settings which we will cover in a later module.

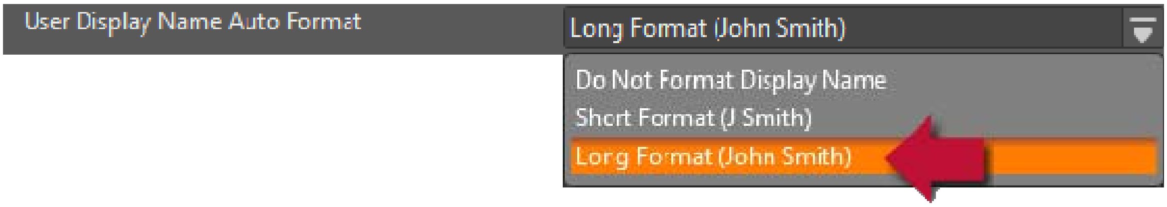
Setting the Display Name Format of Users

The User Display Name Auto Format property allows you to automatically populate the Name field of a user based on the information entered in to the First Name and Last Name fields. This name is used throughout the system to identify users - in event logs, reports, at keypads, etc.

Choose from:

- Short Format: to use the first character of the first name and the full last name (eg `J Smith`)
- Long Format: to use the full first and last names (eg `John Jacob Smith`)

Set it to Long Format now.



User Display Name Auto Format: Long Format (John Smith)

Event Database Capacity

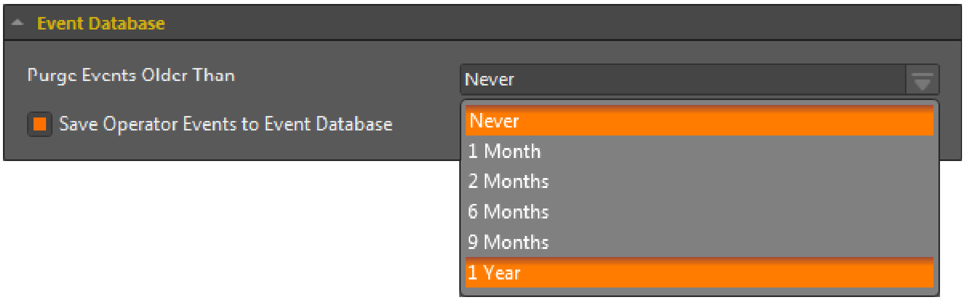
The maximum capacity of your event database varies according to the version of SQL Server you are using.

- SQL Server Express 2008 R2 (the version that is included in the Protege GX setup package), has a database limit of 10GB.
- Earlier version of SQL Server Express (including SQL Server 2005 Express and SQL Server 2008 Express), have a maximum database size is 4GB.
- The full Standard or Enterprise editions of SQL Server have no such size limitation however in reality you will still have limitations based on the physical storage capacity of your server and your ability to manage and backup/restore the database.

Deleting Events from the Event Database

If your event database reaches its capacity, you will have problems.

To help control the database size, we can set the frequency at which events are deleted (or purged) from the database.



Event Database

Purge Events Older Than: Never

☑ Save Operator Events to Event Database

The frequency you choose will vary according to the size and the nature of the site but in most cases 1 year would be sufficient.

The Importance of Backups

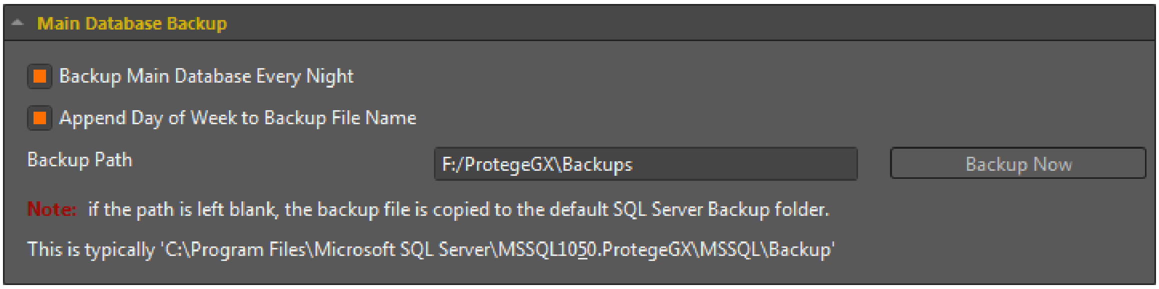
It should probably go without saying, that regular backups are vital in ensuring the data protection of a site. Failure to enable backups can result in irrecoverable data loss.

Many companies will already have an automated backup procedure in place, so talk to the IT department to discuss the options with them.

Protege GX also provides its own built in backup functionality so there is no excuse to not have backups.

> Your backup plan should always account for hardware failure, fire or theft of any computer equipment. This means it's important to get the backup offsite for the purpose of risk mitigation.

Configuring Protege GX Backup Settings



Main Database Backup

☑ Backup Main Database Every Night

☑ Append Day of Week to Backup File Name

Backup Path: F:/ProtegeGX\Backups

Note: if the path is left blank, the backup file is copied to the default SQL Server Backup folder.

This is typically 'C:\Program Files\Microsoft SQL Server\MSSQL10_50.ProtegeGX\MSSQL\Backup'

- Ensure the option to **Backup Main Database Every Night** is enabled.
- Provided the option to **Append Day of Week to Backup File Name** is also selected, a new file is created for each day and only overwritten the following week. If this option is disabled, the backup is overwritten each night with the latest copy.
- Enter the **Backup Path** to define where the backup files will be created. It's a good idea to use an external drive or network location, so the backup is protected in the event of a disk failure.

You can also use the **Backup Now** at any time to perform an instant backup. We recommend you do this before performing an upgrade to protect against damage caused by an installation failure or database upgrade malfunction.

Review Questions

After a configuration change, how long must you wait before the changes take effect?

- □ Protege GX is a server based system so changes take effect immediately
- □ 60 Seconds
- □ The changes won't take effect until you connect to the Controller and download to it
- □ Up to the time that is set in 'Download Retry Delay' under the Controller Configuration tab

After restoring a database and starting the Data Service what additional step(s) must be taken?

- □ Confirm your configuration is correct.
- □ Confirm your configuration is correct. Start the Download Service.
- □ Confirm your configuration is correct. Start the Download Service. Default your Controller.
- □ No additional steps are required as the Database would not restore if the configuration was incorrect.

Which service is responsible for incoming messages?

- □ The Update Service
- □ The Data Service
- □ The Download Service
- □ The Event Service

What does the Details button on the History tab do?

- □ It shows the date/time and operator that modified the record
- □ Runs a detailed event report on the record
- □ It shows the old and new values of fields that were modified
- □ None of the above

What does the Breakout button do?

- □ Opens the current page in another window
- □ Switches to the Alarms page
- □ Exits the software
- □ Closes the current window

What is the Refresh button used for?

□ To clear the filtered results when using the Find tool

□ To update data when a second client window has been used to configure something

□ To update data when another operator may have made changes to the same record

□ All of the above

What is the Events tab in the Programming window used for?

□ To load events for the selected record

□ To load events for the selected record and run a report on these events

□ To show which fields were modified and their old and new values

□ To load events for the selected record, run a report on these events or copy the events to the Windows Clipboard

What is the maximum capacity of SQL Server 2005 Express or SQL Server 2008 Express Database?

□ 32 Million events

□ 4GB

□ Unlimited

□ 10GB

What must you do to prevent the SQL Express event database from reaching its capacity?

□ Periodically delete some events from SQL

□ Purchase a larger hard drive

□ Enter a timeframe in the 'Purge Events' field in Global settings

□ Create an event filter that limits the number of events saved

Where should your database backup be stored?

□ Offsite if possible

□ In the default location of C:\Program Files\Microsoft SQL Server\MSSQL10_50.PROTEGEGX\MSSQL\Backup

□ On a second internal hard drive

□ On a USB thumb drive

Module 131: Hardware Programming

This module outlines the requirements for programming a Controller, configuring a status page to show what is happening on the system, and the steps to take for troubleshooting hardware connections.

In This Module

Programming a Controller

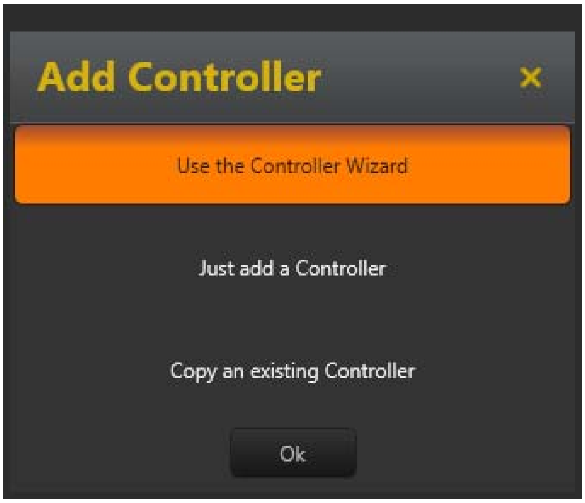
Adding a Controller

To add a controller, select Sites | Controllers from the menu then click Add.

You'll be given 3 options:

1. Use the controller wizard
2. Add an individual controller record
3. Add a new controller based on an existing controller. This option effectively clones an existing controller, including all its records (doors, outputs, etc)

For the purpose of this exercise, we are going to use the first option which adds the controller and the required hardware records.


Add Controller

Use the wizard to add and link all the hardware you might possibly use. It is much easier to delete unwanted items than it is to add and link them later.

Acme Hardware Requirements

Let's go back to our scenario where we are installing an access control system in the Acme Texas office.

We have determined we need the following hardware:

- 1 Controller (2 doors)
- 1 RDM2 Reader Expander (2 Doors)
- 1 Power Supply (4.0A)
- 2 Multi Prox Readers
- 4 Nano Readers
- 1 Keypad
- 3 PIR's

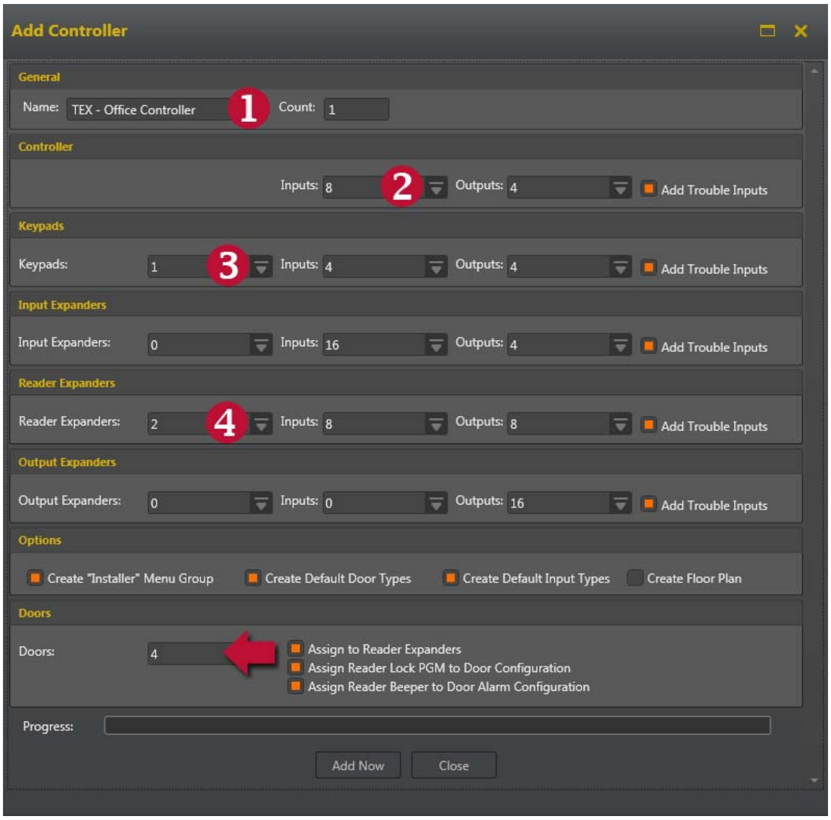
Adding a Controller with Default Records

Using the wizard, we'll add the following hardware records:

1. 1 Controller
2. 8 Controller Inputs
3. 1 Keypad
4. 2 Reader Expanders. The Controller has 2 onboard reader ports but must register as a reader expander to use this functionality. This means we need 1 reader expander for our Controller and 1 for our RDM2.

Note the number of doors has adjusted based on the options selected.

Accept the defaults for the remaining options, then click Add Now to create the records.



Add Controller

General

Name: TEX - Office Controller 1 Count: 1

Controller

Inputs: 8 2 Outputs: 4 ☑ Add Trouble Inputs

Keypads

Keypads: 1 3 Inputs: 4 Outputs: 4 ☑ Add Trouble Inputs

Input Expanders

Input Expanders: 0 Inputs: 16 Outputs: 4 ☑ Add Trouble Inputs

Reader Expanders

Reader Expanders: 2 4 Inputs: 8 Outputs: 8 ☑ Add Trouble Inputs

Output Expanders

Output Expanders: 0 Inputs: 0 Outputs: 16 ☑ Add Trouble Inputs

Options

☑ Create "Installer" Menu Group ☑ Create Default Door Types ☑ Create Default Input Types ☐ Create Floor Plan

Doors

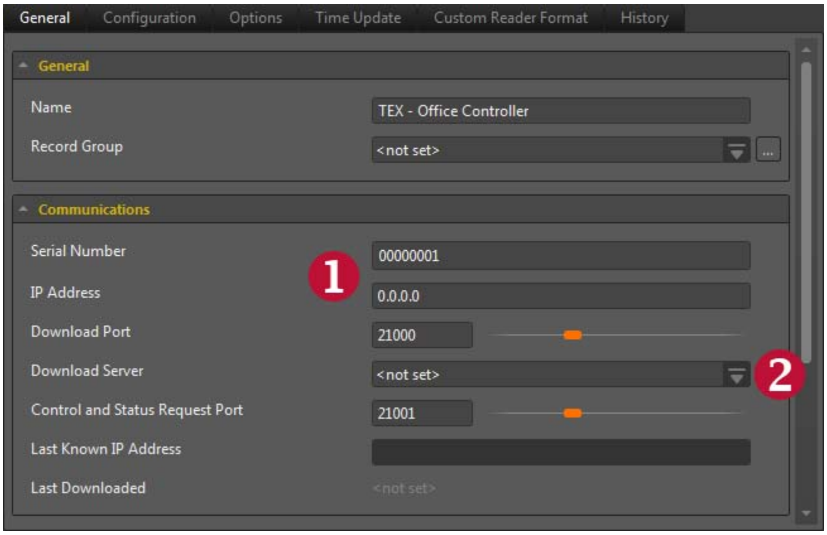
Doors: 4

☑ Assign to Reader Expanders
☑ Assign Reader Lock PGM to Door Configuration
☑ Assign Reader Beeper to Door Alarm Configuration

Progress:

1. Add the serial number and IP address of the Controller, as configured and noted earlier.
2. Set the download server, then click Save.

Your Controller should come online within a few seconds. If it doesn't, proceed to the objective on troubleshooting.



General

Name: TEX - Office Controller

Record Group: <not set>

Communications

Serial Number: 00000001 1

IP Address: 0.0.0.0

Download Port: 21000

Download Server: <not set> 2

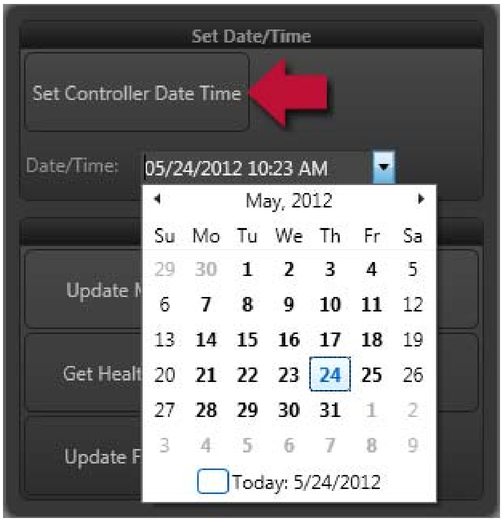
Control and Status Request Port: 21001

Last Known IP Address:

Last Downloaded: <not set>

Setting the Controller Date/Time

By default, the Date/Time is set to the current time of the PC. Right click the Controller to adjust the Date/Time then click Set Controller Date Time to save the changes.



This can be very useful for testing your system as you can enter any date and time.

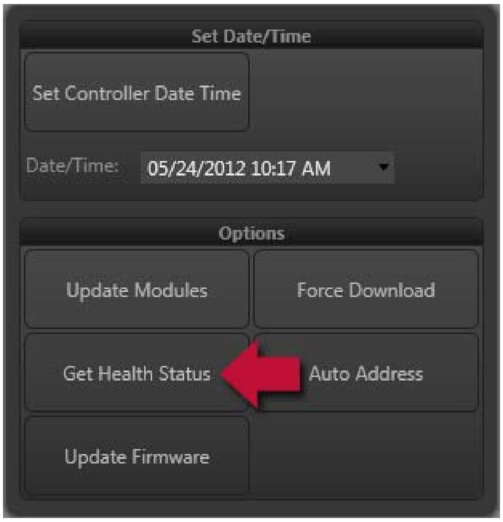
Viewing and Addressing Health Status Issues

The Get Health Status function provides details of the overall status of the system and can be useful in identifying any problem areas that need to be addressed.

To view health status, right-click on the Controller and choose Get Health Status.

The Controller Health Status window appears listing any problems that the Controller has with its current configuration. This includes:

- Controller restarts
- If encryption is disabled
- Modules that require an update
- Modules that are offline
- Services that have been programmed, but not started
- Programmable functions that have been programmed, but not started
- Inputs that have been assigned to an area, but not assigned a type
- Items that can't fit in the Controller database



Essentially, anything that has been configured but that is not operating according to that configuration, is shown in this list.

The health status is generated by the Controller as follows:

1. The Download Server sends configuration data to the Controller
2. The Controller checks the new configuration
3. Any problems are reported back to the Data Server via the Event Server

This can all take time, so it is important to note that a health status problem will not necessarily show up immediately after it has been programmed.

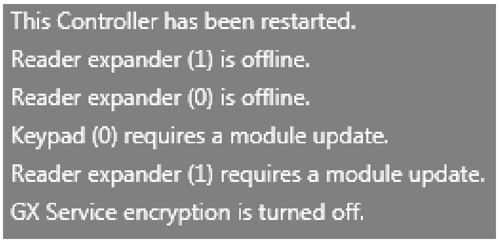
The health status will also show up issues related to compatibility. For example, if you are using a PCB Controller and attempt to use a feature that is unique to the DIN Controller (such as adding a single door to an access level, or programing too many items such as adding more than 5000 Users), the Controller reports this back as a health status issue.

The total health status items are shown on the status bar. This doesn't update immediately, as it looks across every Controller on the system, and is only checked periodically.

It is designed as a diagnostic tool and as a last minute check of the system health before leaving site.

Once our Controller is online, our health status should indicate 6 issues:

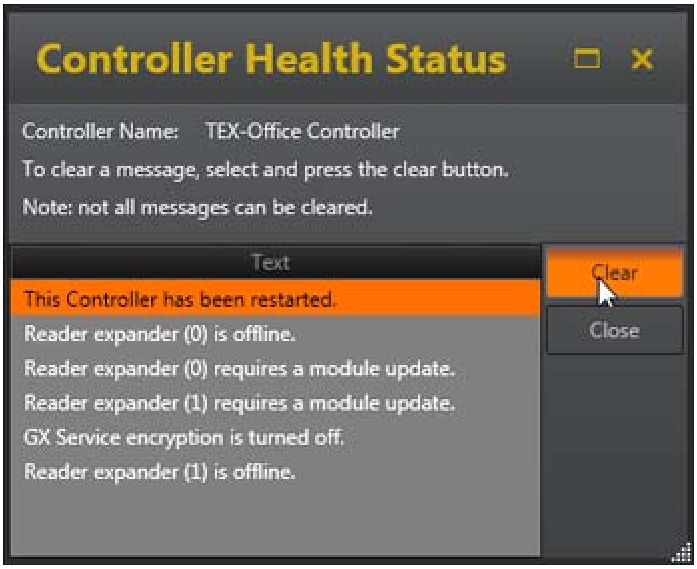
- The first message tells us the Controller has been restarted. This shouldn't happen with a battery backed PSU which is why it's reported as a health status item.
- The second message is telling us that both of our Reader expanders are offline. The number in brackets is the database ID of the item, not the physical address of the hardware. This applies across the system, including the event log.


This Controller has been restarted.
Reader expander (1) is offline.
Reader expander (0) is offline.
Keypad (0) requires a module update.
Reader expander (1) requires a module update.
GX Service encryption is turned off.

- The health status is also advising that both reader expanders require a module update. To do this, we will first need to get them online.
- Finally, the health status is advising us that the encryption between the Controller and the Server is currently disabled.

We can clear the first message, as it is only an advisory notice

- Highlight the message and press Clear


Controller Health Status

Controller Name: TEX-Office Controller
To clear a message, select and press the clear button.
Note: not all messages can be cleared.

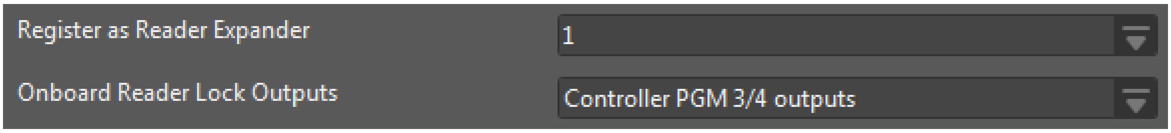
Text
This Controller has been restarted.
Reader expander (0) is offline.
Reader expander (0) requires a module update.
Reader expander (1) requires a module update.
GX Service encryption is turned off.
Reader expander (1) is offline.

- This sends a message to the Controller to tell it to take this message off its Health Status list
- The next time we open the Health Status window, the message will have been cleared. Note also that the number under Health has now reduced.

Enabling the Onboard Reader Expander

Our Reader expanders are currently showing as offline for two reasons. Firstly, the Controller by default does not have its onboard reader expander enabled. Secondly, our RDM2 doesn't have a valid address configured yet.

To enable the Controller onboard reader expander, select the **Configuration** tab of the Controller and set the following **two** options:



Register as Reader Expander: 1

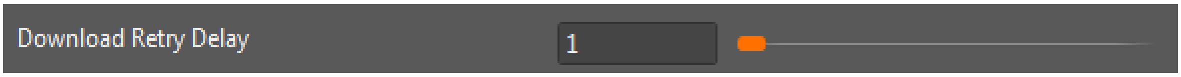
Onboard Reader Lock Outputs: Controller PGM 3/4 outputs

This instructs the Controller to set the address of its onboard reader expander to address 1. It also tells it to use Outputs 3 and 4 as lock outputs. When using a PCB Controller, you may wish to use outputs 1 and 2 (the powered bell outputs) instead.

Downloading Programming Changes

We've just made some programming changes that need to be downloaded to the Controller. The Download Server will discover these changes next time it checks, which may not be for another 60 seconds.

While we are doing our initial programming and testing, we can tell the Download Server to check this more often. This is done by setting the **Download Retry Delay** in the Configuration tab of the Controller. Set this now to 1 second.



Download Retry Delay: 1

This tells the download server to check the Controllers configuration every second. We will reduce this while we are doing our initial programming, but set this back when we have finished.

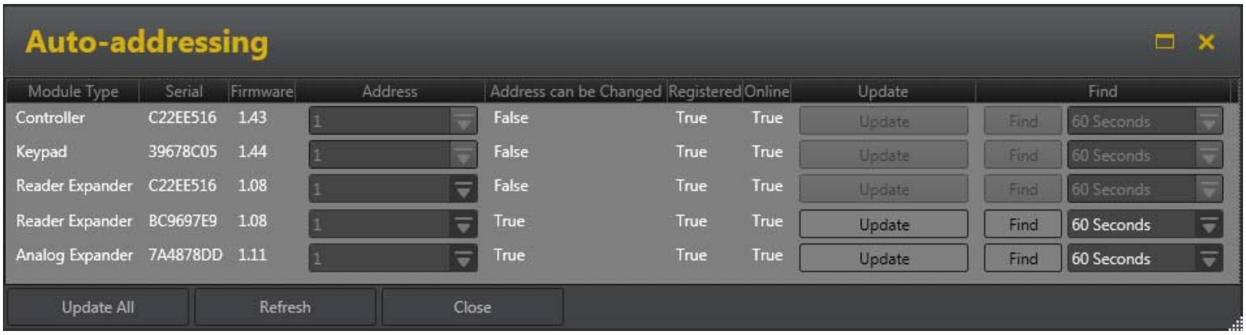
We can also force the Download Server to download the configuration at any time, by right clicking the Controller and selecting **Force Download**.

Try this now.

Addressing Modules

- Right click the Controller and select **Auto Address**.

  The auto addressing window displays a list of expanders that are (or have been) connected to the Controller. Listed here are all expanders that have reported to the Controller since the last Controller module update or power cycle.



Auto-addressing

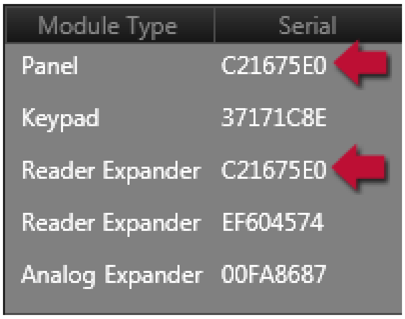
Module Type	Serial	Firmware	Address	Address can be Changed	Registered	Online	Update	Find	
Controller	C22EE516	1.43	1	False	True	True	Update	Find	60 Seconds
Keypad	39678C05	1.44	1	False	True	True	Update	Find	60 Seconds
Reader Expander	C22EE516	1.08	1	False	True	True	Update	Find	60 Seconds
Reader Expander	BC9697E9	1.08	1	True	True	True	Update	Find	60 Seconds
Analog Expander	7A4878DD	1.11	1	True	True	True	Update	Find	60 Seconds

Listed for each module is:

- The module type
- The serial number
- Current firmware version
- Whether the module address can be changed by Auto-addressing
- Whether the module is registered with the Controller
- Whether the module is currently online

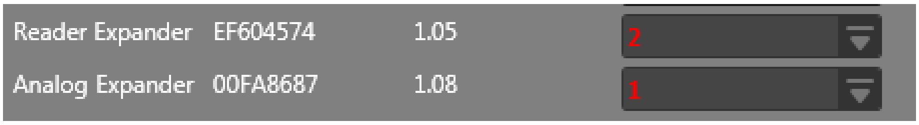
If the module is from the DIN Rail range, you can use the Auto-addressing function to address it. By default, modules are shipped from the ICT factory with an address of 254. This is outside the range that the Controller will accept, and must therefore be set by the installer.

You'll note that the Controller and one of the reader expanders are showing the same serial number. This is because your Controller has now been configured to register as Reader Expander 1.



Module Type	Serial
Panel	C21675E0
Keypad	37171C8E
Reader Expander	C21675E0
Reader Expander	EF604574
Analog Expander	00FA8687

- Set the address of your RDM2 to **2** and your PSU (shown as an Analog Expander) to **1**.



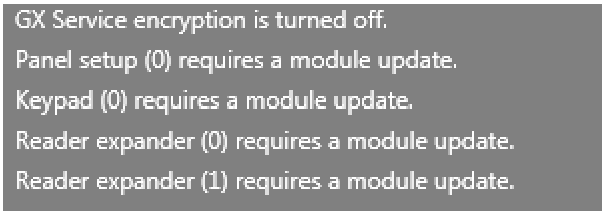
Reader Expander	EF604574	1.05	2
Analog Expander	00FA8687	1.08	1

The addresses are shown in red because they have not been updated. You can do this either by clicking the **Update** button beside each module, or by clicking the **Update All** button.

- Wait for your modules to come back online, then click **Refresh**.

Module Update

If you check your Health Status now, you should have everything online:



GX Service encryption is turned off.

Panel setup (0) requires a module update.

Keypad (0) requires a module update.

Reader expander (0) requires a module update.

Reader expander (1) requires a module update.

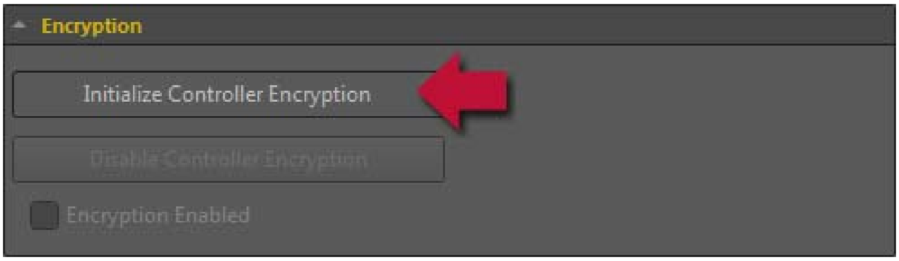
We'll deal with the service encryption in just a moment.

The other messages are all in relation to items requiring module updates. This can be resolved by right clicking on the Controller and selecting **Update Modules**. This updates **all** modules connected to the Controller.

A module update is required whenever a programming change is made that requires the hardware to function in a different manner. The Controller will advise you whenever this is required by generating a health status message.

Enabling Encryption

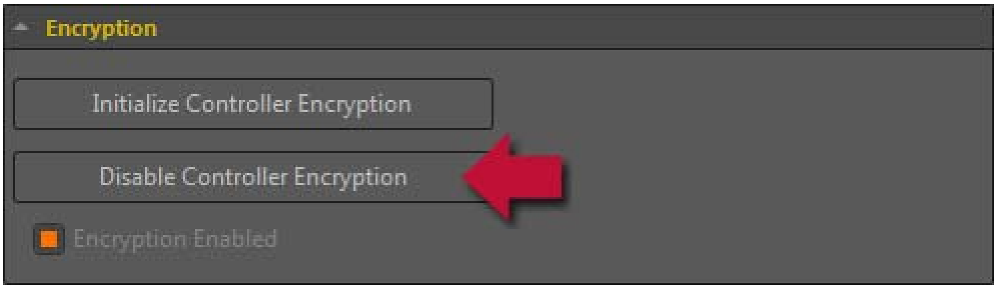
To enable encryption click the Configuration tab of the controller and select **Initialize Controller Encryption**:



Encryption
Initialize Controller Encryption
Disable Controller Encryption
□ Encryption Enabled

Disabling Encryption

To disable encryption, select the option to **Disable Controller Encryption**:



Encryption
Initialize Controller Encryption
Disable Controller Encryption
☑ Encryption Enabled

This disables encryption at the **server end** only. The result is that the controller will now ignore all messages from the server as they are not encrypted. Similarly, the server will not understand any of the messages sent back from the controller as they are encrypted with a key that the server no longer understands.

To disable encryption on the **controller**, the controller must be defaulted. This is a security feature and ensures that the only way to remove encryption is physically on site.

Firmware Updates

You should always check the ICT website to ensure you are running the latest software and firmware versions.

If your controller is running older firmware, update it by right clicking on the controller and clicking Update Firmware. Enter the file name or click the [...] button to browse to the new firmware file.

You can select multiple controllers to update. The software updates them sequentially, and reports the results when complete.

The new DIN Rail Controller has enough storage space and CPU power that it can download the new firmware while continuing to run the system. When the firmware has been downloaded and the integrity verified, the controller does a quick restart and boots up with the new firmware running.

Status Pages

Now that we have our hardware up and running and we want to begin the rest of our system programming and testing, it would be good to have a way of seeing what is happening on the system. The best way to do this is with a Status Page.

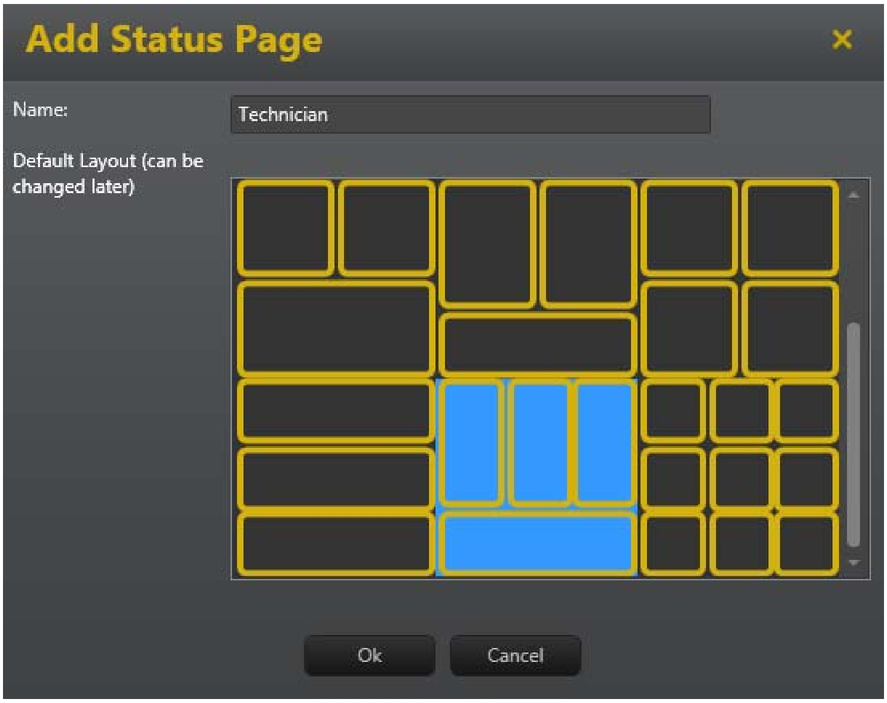
Status pages are usually designed by the integrator, and are a quick and efficient way to get an overview of your Protege system in one easy place. They are used to display information from the Protege system as well as external systems, such as DVRs / NVRs, websites and documents.

Creating a Technician Status Page

1. Open the Status Page Editor:

   Monitoring | Setup | Status Page Editor

2. Name the page Technician, then scroll down and select the layout as shown:



Add Status Page

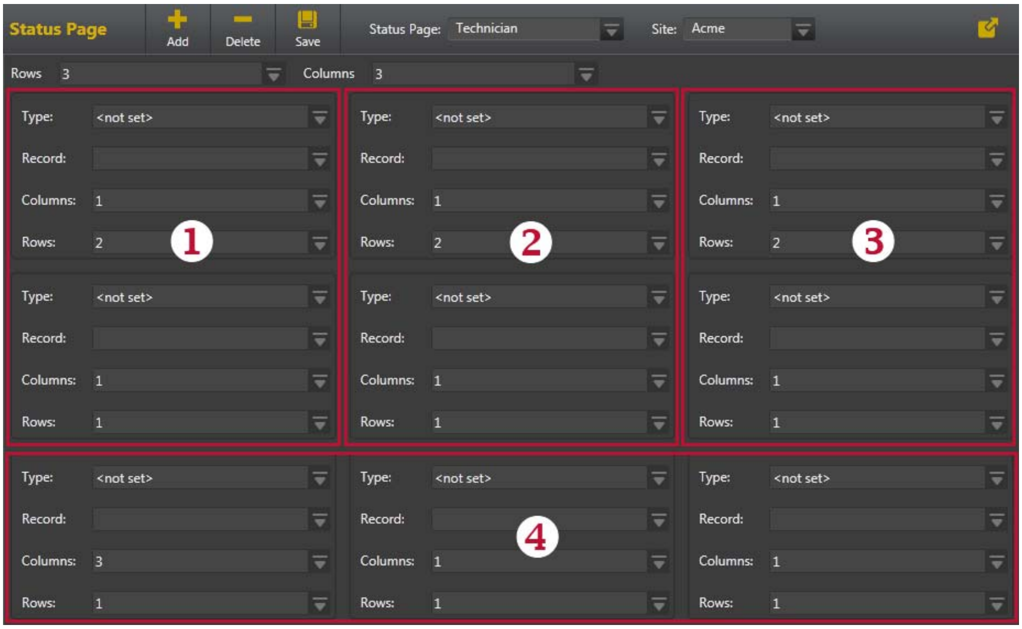
Name: Technician

Default Layout (can be changed later)

3. Click OK. This creates an empty page with a preset layout. The layout can be changed later, so this is just a starting point.

Status Page Layout

The layout we've chosen creates a 3 x 3 grid. Items can be set to span multiple rows and/or columns giving us control over the layout.



Status Page: Technician
Site: Acme
Rows 3
Columns 3

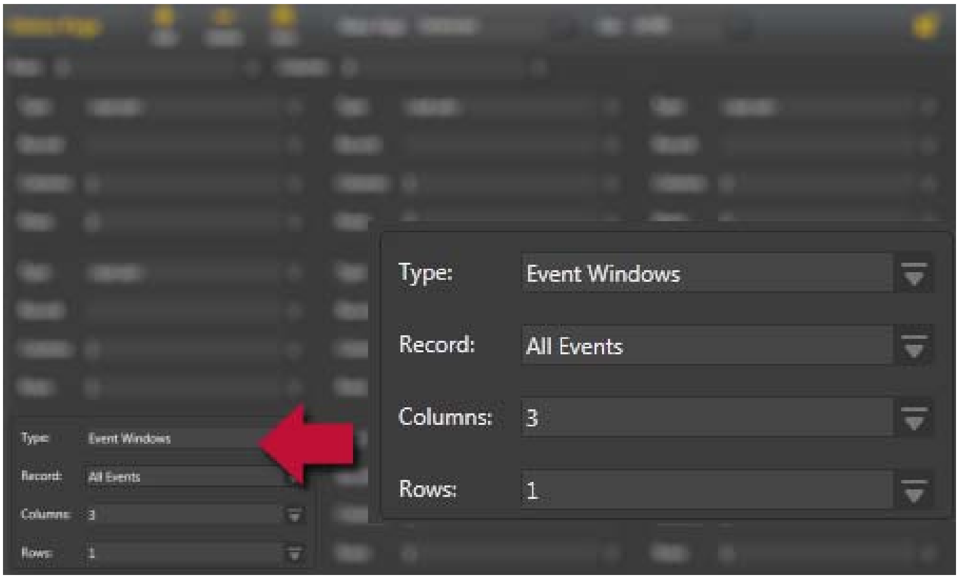
Type: <not set> Record: Columns: 1 Rows: 2	Type: <not set> Record: Columns: 1 Rows: 2	Type: <not set> Record: Columns: 1 Rows: 2
Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1
Type: <not set> Record: Columns: 3 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1

- Item 1 spans the first two rows of the first column
- Item 2 spans the first two rows of the second column
- Item 3 spans the first two rows of the third column
- Item 4 has been set to appear in the third row and span all three columns

Adding Content to a Status Page

Now that we have the layout, we want to add content to each of the panels.

1. In the bottom left panel, set the Type to Event Windows and choose the All Events Record.



Type: Event Windows
Record: All Events
Columns: 3
Rows: 1

2. Click Save. This will add the event window to the bottom panel of our status page, displaying a live view of events as they occur.

Status Lists

The next option we are going to look at is **status lists.**

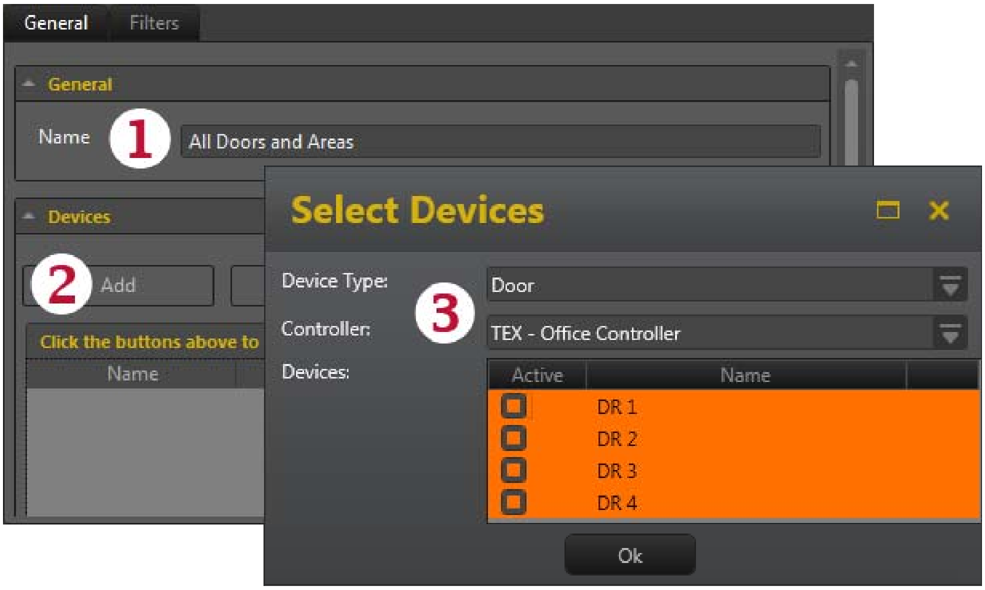
A status list is a list of system items usually created by the integrator, and is used to provide a real time display of the defined devices.

Status lists can contain any number of items, and can contain items of different types (eg inputs and outputs).

Creating Status Lists

Navigate to **Monitoring** | **Setup** | **Status Lists**

1. Change the name of the default status list to **All Doors and Areas**.



Name: All Doors and Areas

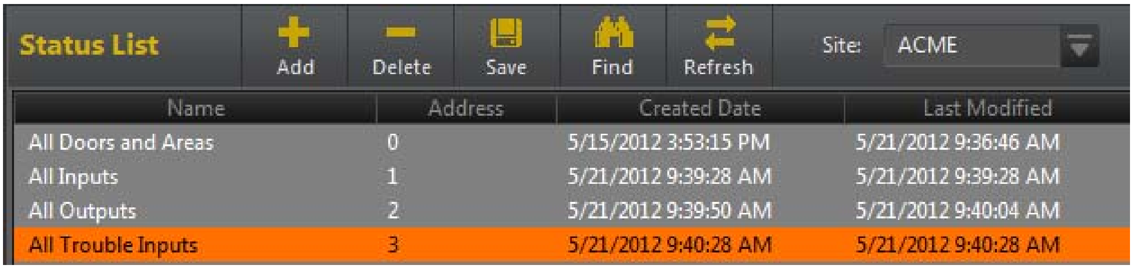
Device Type: Door

Controller: TEX - Office Controller

Devices:

Active	Name
□	DR 1
□	DR 2
□	DR 3
□	DR 4

2. Click **Add** to open the Select Devices window
3. Set the **Device Type** to Door and choose your **Controller**
4. To quickly select all devices, click an item and press **CTRL+A** then check any of the boxes
5. Click **OK** then select **Save**
6. Add a new status list by clicking the **Add** button on the main toolbar
7. Call this one **All Inputs**
8. Change the device type to Input, select the Controller, then choose all of the inputs
9. Repeat to create additional status lists for **All Outputs** and **All Trouble Inputs**
10. You should now have 4 status lists:

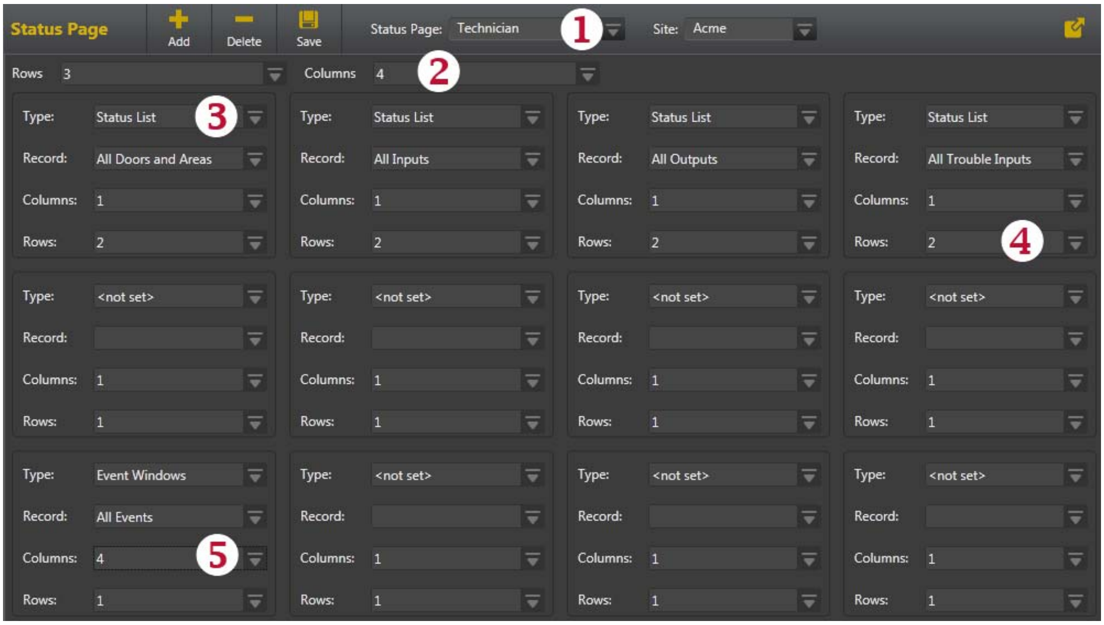


Site: ACME

Name	Address	Created Date	Last Modified
All Doors and Areas	0	5/15/2012 3:53:15 PM	5/21/2012 9:36:46 AM
All Inputs	1	5/21/2012 9:39:28 AM	5/21/2012 9:39:28 AM
All Outputs	2	5/21/2012 9:39:50 AM	5/21/2012 9:40:04 AM
All Trouble Inputs	3	5/21/2012 9:40:28 AM	5/21/2012 9:40:28 AM

Editing a Status Page

Go back to the **Status Page Editor** (Monitoring | Setup | Status Page Editor)



Status Page: Technician

Site: Acme

Rows 3

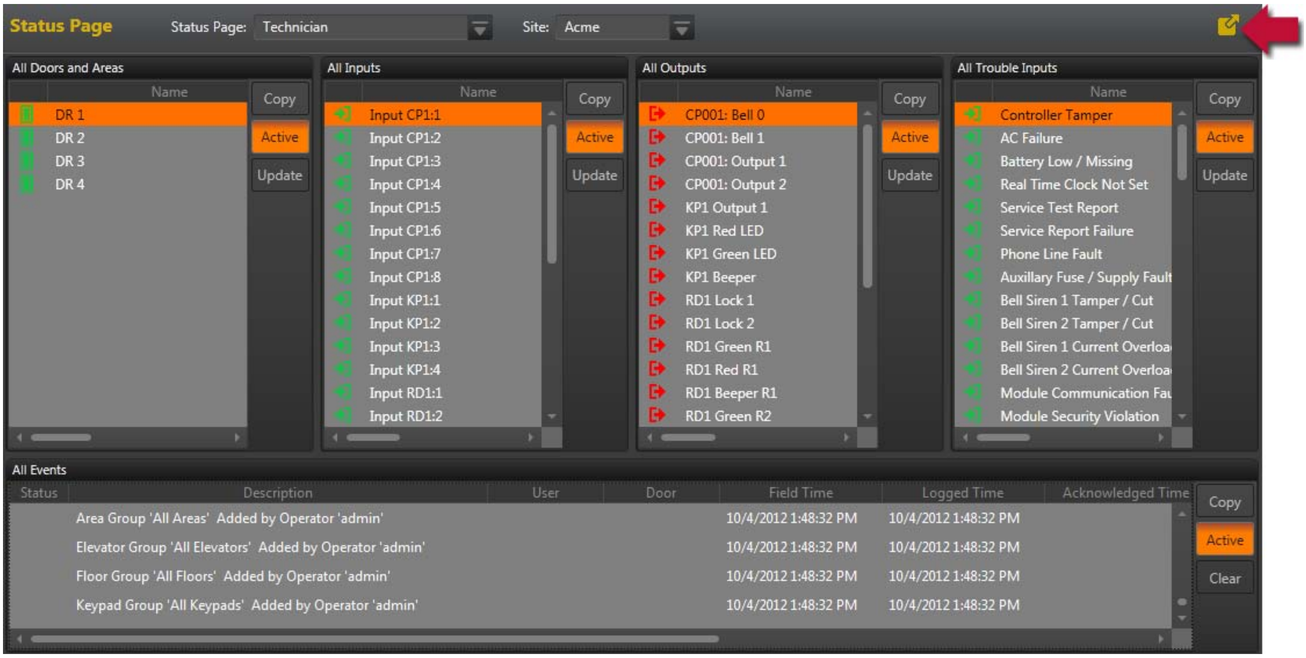
Columns 4

Type: Status List Record: All Doors and Areas Columns: 1 Rows: 2	Type: Status List Record: All Inputs Columns: 1 Rows: 2	Type: Status List Record: All Outputs Columns: 1 Rows: 2	Type: Status List Record: All Trouble Inputs Columns: 1 Rows: 2
Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1
Type: Event Windows Record: All Events Columns: 4 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1

1. Click **Cancel** to exit the wizard then choose your **Technician** page from the dropdown
2. Set the **Columns** to 4
3. Now, in each of the top panels, set the Type to **Status List** and choose a different list for each
4. Make sure you set the **Rows** to **2** in the right most panel
5. Finally, adjust the **Event Window** so it spans all 4 columns
6. Save your changes

View the Finished Status Page

Navigate to Monitoring | Status Page View and select your Technician page



Status Page Status Page: Technician Site: Acme

All Doors and Areas

Name
DR 1
DR 2
DR 3
DR 4

All Inputs

Name
Input CP1:1
Input CP1:2
Input CP1:3
Input CP1:4
Input CP1:5
Input CP1:6
Input CP1:7
Input CP1:8
Input KP1:1
Input KP1:2
Input KP1:3
Input KP1:4
Input RD1:1
Input RD1:2

All Outputs

Name
CP001: Bell 0
CP001: Bell 1
CP001: Output 1
CP001: Output 2
KP1 Output 1
KP1 Red LED
KP1 Green LED
KP1 Beeper
RD1 Lock 1
RD1 Lock 2
RD1 Green R1
RD1 Red R1
RD1 Beeper R1
RD1 Green R2

All Trouble Inputs

Name
Controller Tamper
AC Failure
Battery Low / Missing
Real Time Clock Not Set
Service Test Report
Service Report Failure
Phone Line Fault
Auxillary Fuse / Supply Fault
Bell Siren 1 Tamper / Cut
Bell Siren 2 Tamper / Cut
Bell Siren 1 Current Overloa
Bell Siren 2 Current Overloa
Module Communication Fau
Module Security Violation

All Events

Status	Description	User	Door	Field Time	Logged Time	Acknowledged Time
	Area Group 'All Areas' Added by Operator 'admin'			10/4/2012 1:48:32 PM	10/4/2012 1:48:32 PM	
	Elevator Group 'All Elevators' Added by Operator 'admin'			10/4/2012 1:48:32 PM	10/4/2012 1:48:32 PM	
	Floor Group 'All Floors' Added by Operator 'admin'			10/4/2012 1:48:32 PM	10/4/2012 1:48:32 PM	
	Keypad Group 'All Keypads' Added by Operator 'admin'			10/4/2012 1:48:32 PM	10/4/2012 1:48:32 PM	

Click the ↗ button to open the page in a secondary window. This enables you to keep the status page open while you continue programming in the main window. Note that for the rest of this course, it is assumed that you will have this status page displayed in a second window.

Troubleshooting Hardware

If your controller is not coming online, you need to follow some basic troubleshooting steps.

Controller Connectivity

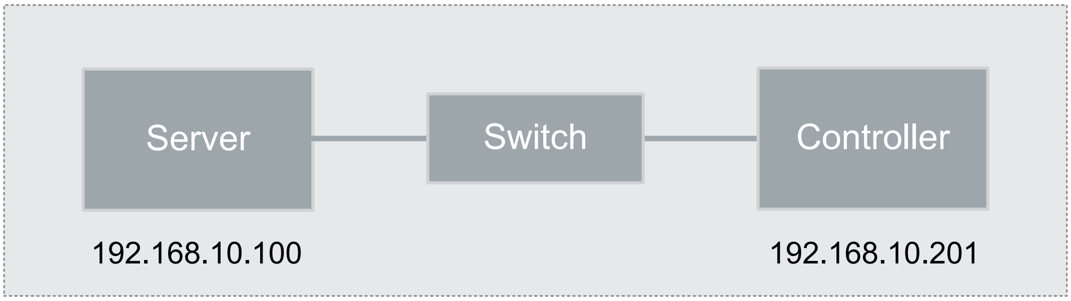
The first step is to establish what is **between** the server and controller

Server
Controller

Depending on whether the controller and server are on the same sub network or not will affect how you go about troubleshooting

Simple Networks

If the server and controller are on the same sub network, troubleshooting the network path is somewhat easier

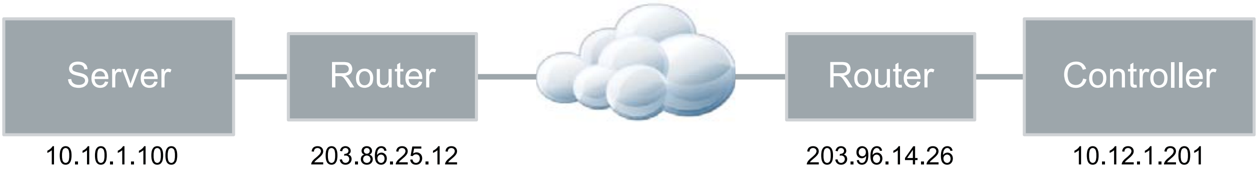


Devices on the same sub network only have switches or hubs connecting them together

This means the server and controller should be able to communicate directly if they are both physically connected to the network

Complex Networks

If your network has routers between the controller and server, then troubleshooting can be more difficult



Troubleshooting networks such as these are beyond the scope of this qualification

Requirements

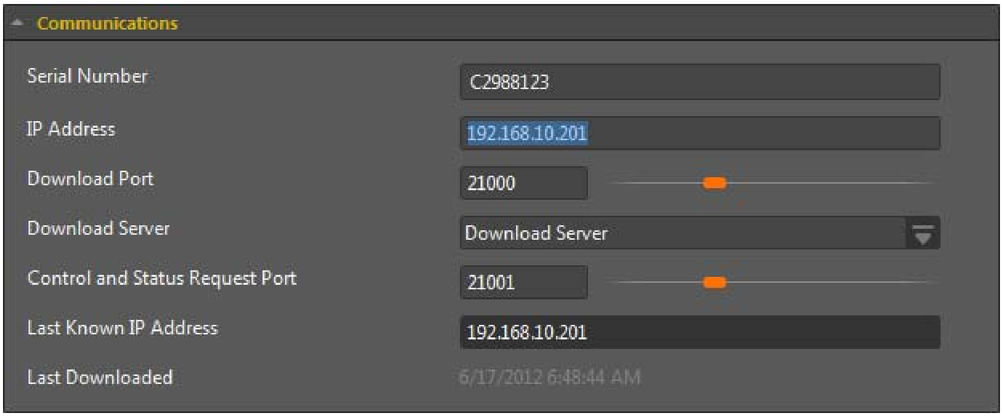
For the server and controller to communicate, the following things are required:

1. The server must have the correct IP address of the controller
2. The controller must be contactable on ports 21000 and 21001
3. The controller must have the Event Server IP address set correctly
4. The Event Server must be contactable on port 22000
5. The server must have the correct controller serial number to properly identify incoming messages from it
6. Encryption must either be disabled at both ends or enabled at both ends with the correct encryption key

Confirm the Controller IP Address

For the Server to be able to contact the Controller, it must have the correct IP address programmed and be able to reach that IP address

From the Controller general tab, highlight and copy (CTRL + C) the IP address:



Communications

Serial Number: C2988123

IP Address: 192.168.10.201

Download Port: 21000

Download Server: Download Server

Control and Status Request Port: 21001

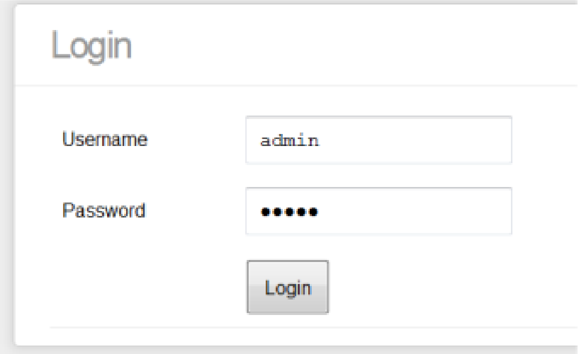
Last Known IP Address: 192.168.10.201

Last Downloaded: 6/17/2012 6:48:44 AM

Paste (CTRL +V) this into the address bar of a web browser on the Server

If the Controller is reachable, you should be presented with a login screen like either shown below:

DIN Controller

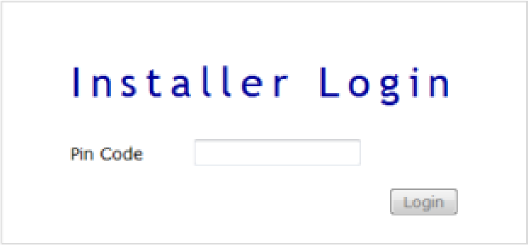


Login

Username: admin

Password: •••••

PCB Controller



Installer Login

Pin Code:

If you are unable to web browse to the Controller, then it is likely that you have a network problem. If this is the case, skip to the Network troubleshooting section.

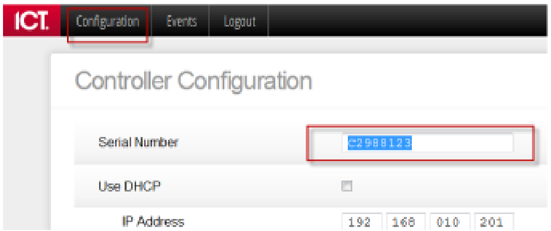
Otherwise, log in to the Controller using the default admin login of admin for a DIN Controller or 000000 for a PCB Controller.

Confirm the Controller Serial Number

Incoming messages from the controller to the server are identified by the controller serial number

Highlight and copy (CTRL + C) the serial number from the controller web page:

DIN Controller



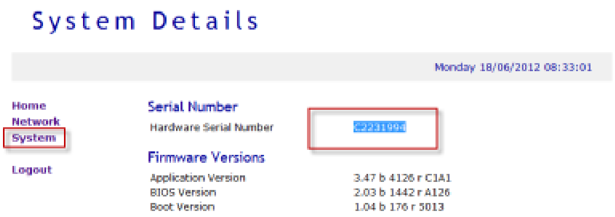
Controller Configuration

Serial Number C2988123

Use DHCP □

IP Address 192 168 010 201

PCB Controller



System Details

Monday 18/06/2012 08:33:01

Serial Number

Hardware Serial Number C2231994

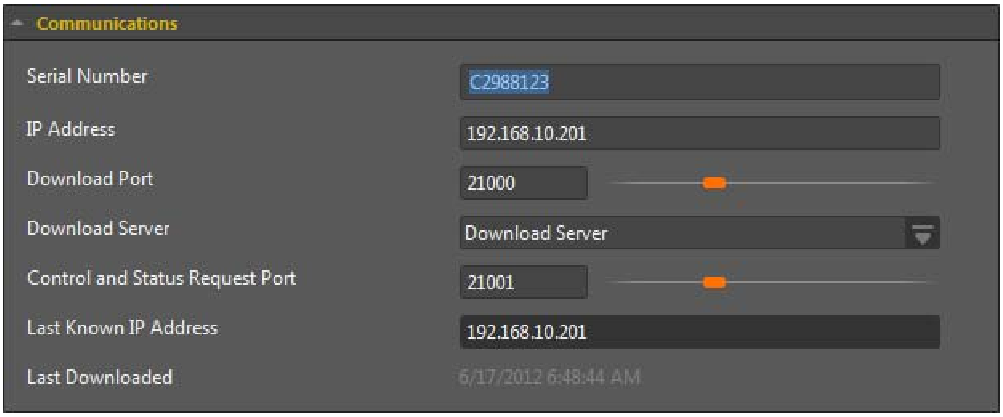
Firmware Versions

Application Version 3.47 b 4126 r C1A1

BIOS Version 2.03 b 1442 r A126

Boot Version 1.04 b 176 r 5013

Paste (CTRL + V) the copied serial number to the controller configuration:



Communications

Serial Number: C2988123

IP Address: 192.168.10.201

Download Port: 21000

Download Server: Download Server

Control and Status Request Port: 21001

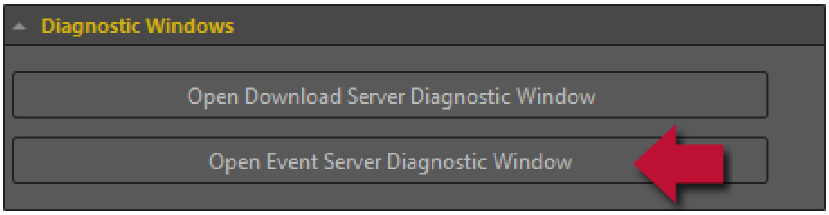
Last Known IP Address: 192.168.10.201

Last Downloaded: 6/17/2012 6:48:44 AM

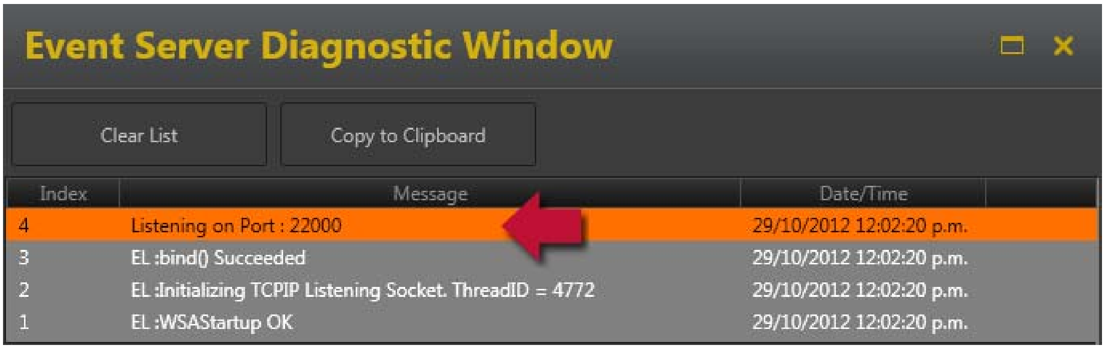
Confirm the Event Server is Functioning

To confirm that the Event Server is functioning and listening on the correct port for incoming events, open the Event Server diagnostic window

- Navigate to Sites | Controllers. Expand the Diagnostic Windows group
- Select Open Event Server Diagnostic Window


Diagnostic Windows
Open Download Server Diagnostic Window
Open Event Server Diagnostic Window

- Confirm that the server is listening on the correct port. The default event server port is 22000.

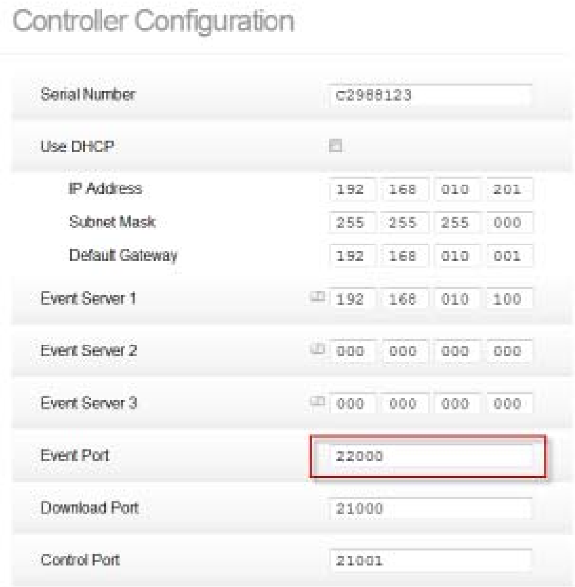


Index	Message	Date/Time
4	Listening on Port : 22000	29/10/2012 12:02:20 p.m.
3	EL :bind() Succeeded	29/10/2012 12:02:20 p.m.
2	EL :Initializing TCPIP Listening Socket. ThreadID = 4772	29/10/2012 12:02:20 p.m.
1	EL :WSAStartup OK	29/10/2012 12:02:20 p.m.

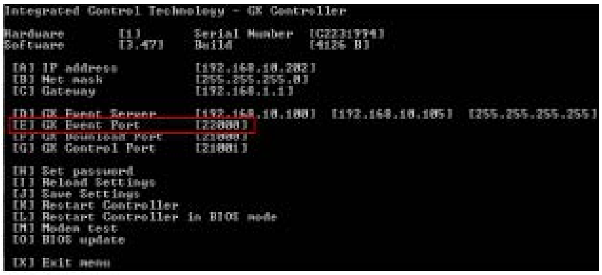
This shows that the event server is accepting events on port 22000

- Confirm that the Event Server port is correctly set at the Controller

  For the DIN Controller this is done via the web interface, but for the PCB Controller this is done via Telnet

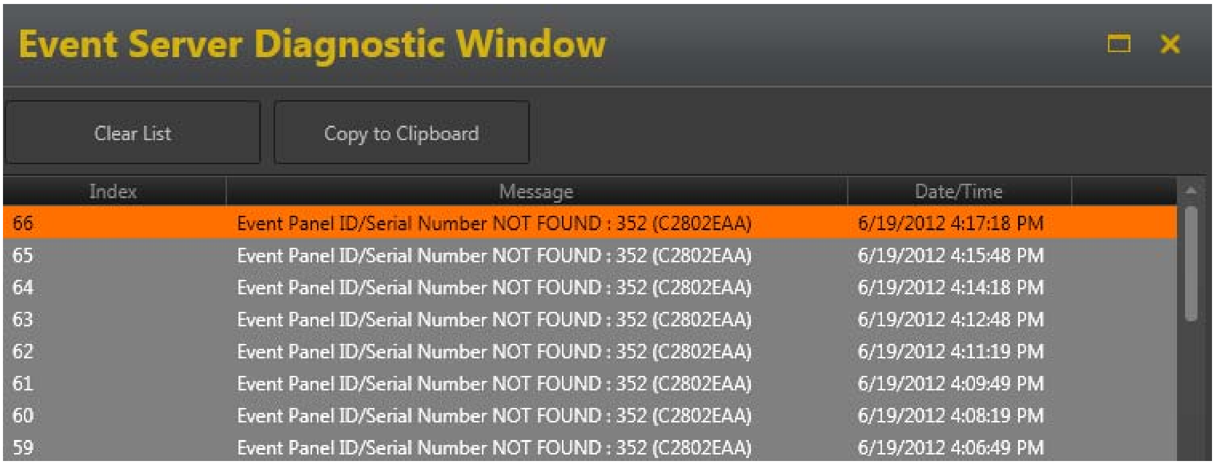


Serial Number	C2988123
Use DHCP	□
IP Address	192 168 010 201
Subnet Mask	255 255 255 000
Default Gateway	192 168 010 001
Event Server 1	192 168 010 100
Event Server 2	000 000 000 000
Event Server 3	000 000 000 000
Event Port	22000
Download Port	21000
Control Port	21001



```
Integrated Control Technology - GX Controller

Hardware        [1]      Serial Number  [C2231994]
Software        [3.47]   Build          [4126 B]

 [A] IP address          [192.168.10.202]
 [B] Net mask            [255.255.255.0]
 [C] Gateway             [192.168.1.1]

 [D] GX Event Server     [192.168.10.100]  [192.168.10.105]  [255.255.255.255]
 [E] GX Event Port       [22000]
 [F] GX Download Port    [21000]
 [G] GX Control Port     [21001]

 [H] Set password
 [I] Reload Settings
 [J] Save Settings
 [K] Restart Controller
 [L] Restart Controller in BIOS mode
 [M] Modem test
 [O] BIOS update

 [X] Exit menu
```

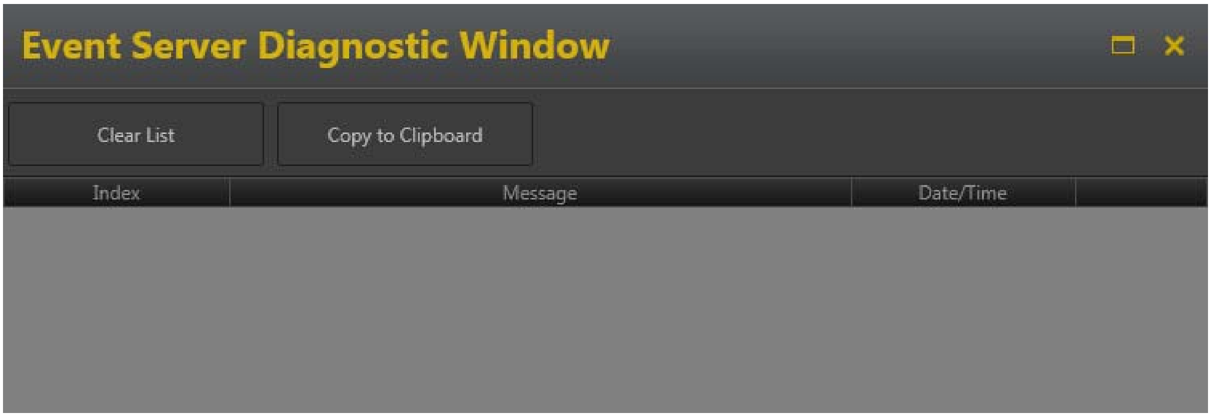
- If the Event Server diagnostic window shows messages about an unknown serial number, then events are being received from a Controller with the serial number listed



Index	Message	Date/Time
66	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:17:18 PM
65	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:15:48 PM
64	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:14:18 PM
63	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:12:48 PM
62	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:11:19 PM
61	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:09:49 PM
60	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:08:19 PM
59	Event Panel ID/Serial Number NOT FOUND : 352 (C2802EAA)	6/19/2012 4:06:49 PM

This also means that the event server is accepting incoming events

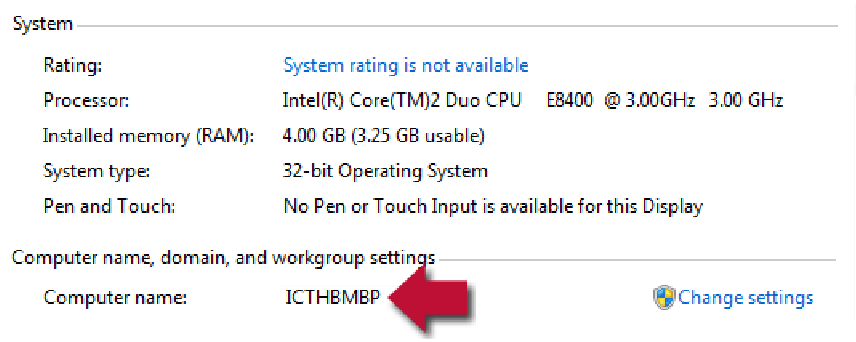
- If the Event Server diagnostic window contains no text, then you have a problem with the configuration of the Event Server:



This means that the event server is **not** accepting incoming events

Check the Computer Name

On the Server, open **Control Panel | All Control Panel Items | System**



System

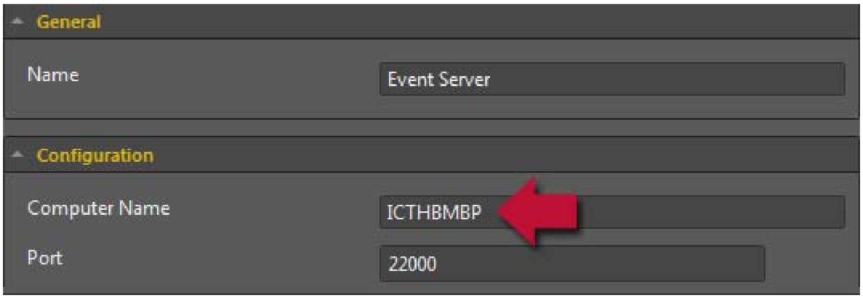
Rating:	System rating is not available
Processor:	Intel(R) Core(TM)2 Duo CPU E8400 @ 3.00GHz 3.00 GHz
Installed memory (RAM):	4.00 GB (3.25 GB usable)
System type:	32-bit Operating System
Pen and Touch:	No Pen or Touch Input is available for this Display

Computer name, domain, and workgroup settings

Computer name:	ICTHBMBP	Change settings

Copy the **Computer name**

Within Protege GX, navigate to **Global | Event Server** and ensure that the **Computer Name** matches the server **PC Name**



General

Name	Event Server

Configuration

Computer Name	ICTHBMBP
Port	22000

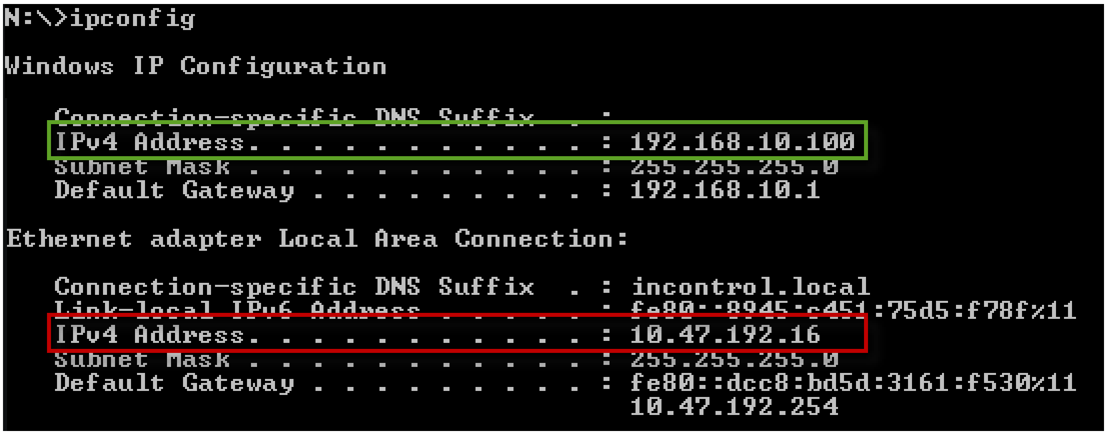
This usually only changes when you have restored a database from a different PC

If the name doesn't match, change it. You will also need to update the name of the Download Server (**Global | Download Server**).

Confirm the Event Server IP Address

For messages to get from the Controller to the Server, the Event Server IP address must be programmed correctly

- Open a command prompt at the Server and type **ipconfig** then press [Enter]



```
N:\>ipconfig

Windows IP Configuration

   Connection-specific DNS Suffix  . :
   IPv4 Address. . . . . . . . . . . : 192.168.10.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.10.1

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix  . : incontrol.local
   Link-local IPv6 Address . . . . . : fe80::8945:c451:75d5:f78f%11
   IPv4 Address. . . . . . . . . . . : 10.47.192.16
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::dcc8:bd5d:3161:f530%11
                                       10.47.192.254
```

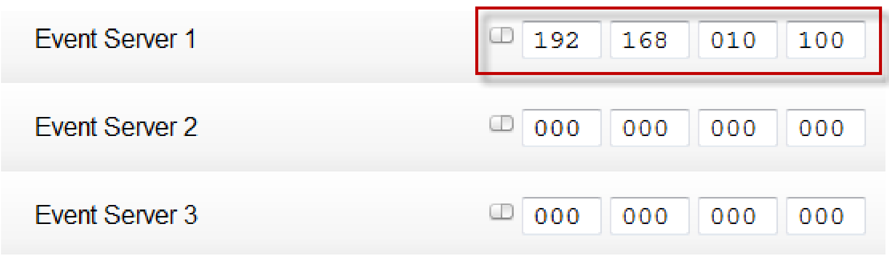
- If the Server has more than one IP address, select the one that is on the same sub network as the Controller. In this case, 192.168.10.100

The Event Server will accept events on any IP network interface as long as the appropriate port is open (22000 by default)

- Now check that the Event Server IP is set correctly at the Controller

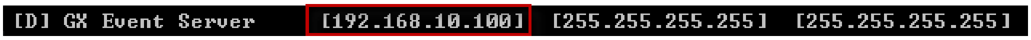
  This is configured in the web interface for the DIN Controller or via Telnet for the PCB Controller:

DIN Controller



Event Server 1	192	168	010	100
Event Server 2	000	000	000	000
Event Server 3	000	000	000	000

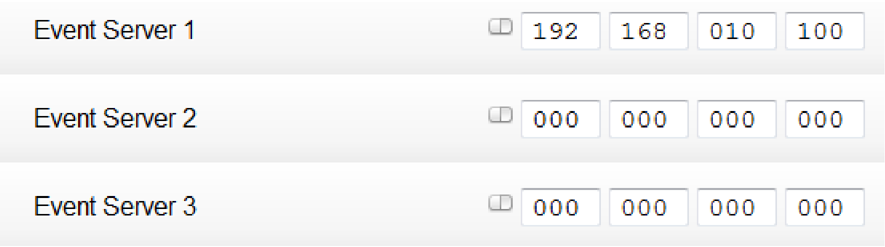
PCB Controller



```
[D] GX Event Server      [192.168.10.100]  [255.255.255.255]  [255.255.255.255]
```

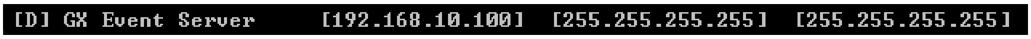
- There are three spaces for entering the Event Server IP:

DIN Controller



Event Server 1	192	168	010	100
Event Server 2	000	000	000	000
Event Server 3	000	000	000	000

PCB Controller

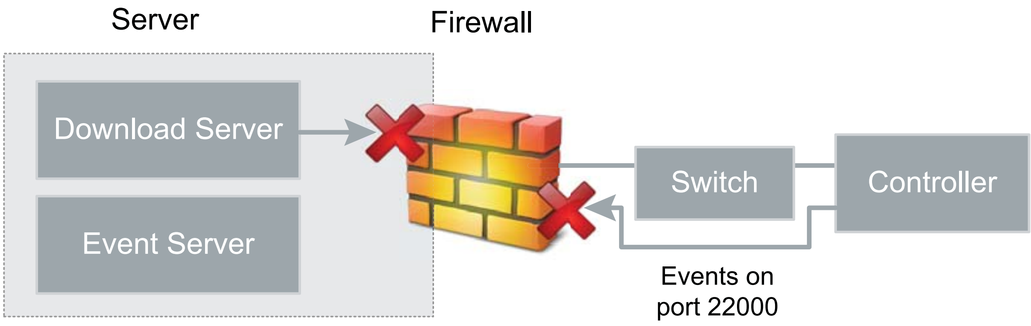


```
[D] GX Event Server      [192.168.10.100]  [255.255.255.255]  [255.255.255.255]
```

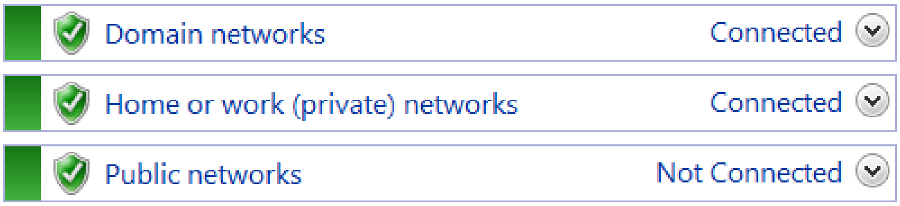
This is for situations where Controllers have multiple paths to the Server. In most cases, the second and third Event Server IP addresses should be left as all zeros or all 255s.

Windows Firewall

When the Controller and Server are on the same local network, the only place that a firewall can be blocking messages is on the Server PC itself. This is called the Windows Firewall:

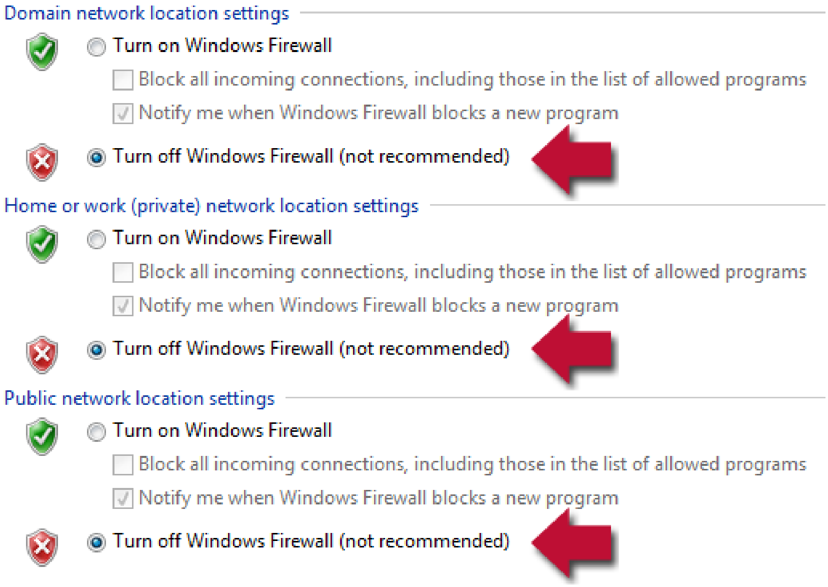


- Open the Windows Firewall settings: Control Panel | All Control Panel Items | Windows Firewall



Domain networks	Connected
Home or work (private) networks	Connected
Public networks	Not Connected

- If the firewall is on, it will be shown in green
- To eliminate the Windows Firewall as a cause of communication problems, turn it off temporarily by clicking the **Turn Windows Firewall on or off** link at the left of the screen:



Domain network location settings

○ Turn on Windows Firewall

□ Block all incoming connections, including those in the list of allowed programs

☑ Notify me when Windows Firewall blocks a new program

● Turn off Windows Firewall (not recommended)

Home or work (private) network location settings

○ Turn on Windows Firewall

□ Block all incoming connections, including those in the list of allowed programs

☑ Notify me when Windows Firewall blocks a new program

● Turn off Windows Firewall (not recommended)

Public network location settings

○ Turn on Windows Firewall

□ Block all incoming connections, including those in the list of allowed programs

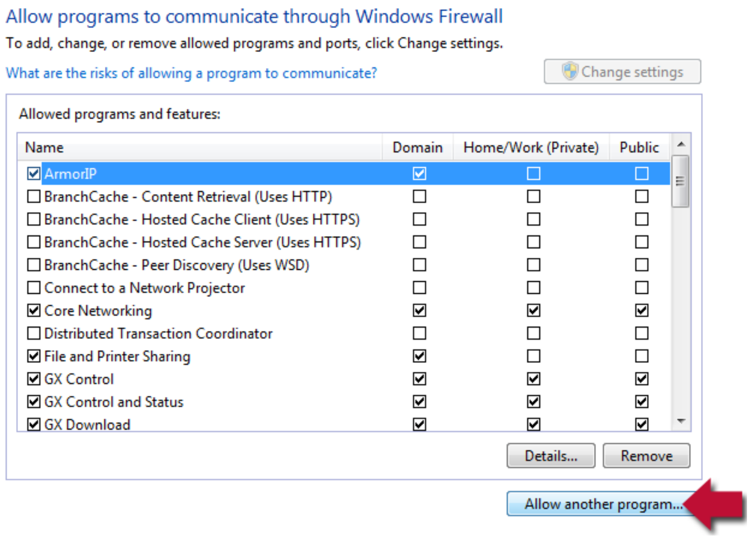
☑ Notify me when Windows Firewall blocks a new program

● Turn off Windows Firewall (not recommended)

Then turn off the firewall for all network locations.

If this fixes the issue, you may choose to leave the firewall off. Alternatively you can allow the services through the firewall by clicking the **Allow a program or feature through Windows Firewall** link.

- Select **Allow another program** to add the program as an exception.



Allow programs to communicate through Windows Firewall

To add, change, or remove allowed programs and ports, click Change settings.

What are the risks of allowing a program to communicate?

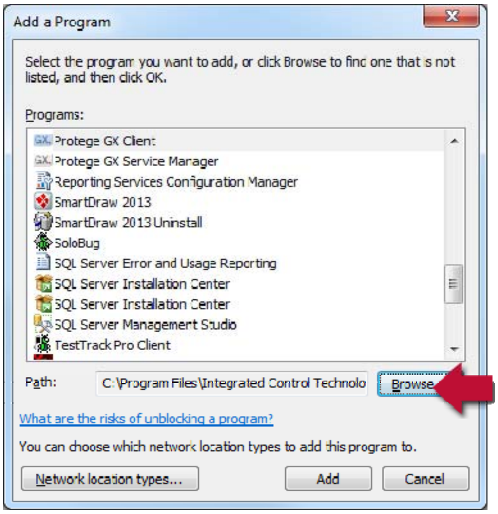
Allowed programs and features:

Name	Domain	Home/Work (Private)	Public
☑ ArmorIP	☑	□	□
□ BranchCache - Content Retrieval (Uses HTTP)	□	□	□
□ BranchCache - Hosted Cache Client (Uses HTTPS)	□	□	□
□ BranchCache - Hosted Cache Server (Uses HTTPS)	□	□	□
□ BranchCache - Peer Discovery (Uses WSD)	□	□	□
□ Connect to a Network Projector	□	□	□
☑ Core Networking	☑	☑	☑
□ Distributed Transaction Coordinator	□	□	□
☑ File and Printer Sharing	☑	□	□
☑ GX Control	☑	☑	☑
☑ GX Control and Status	☑	☑	☑
☑ GX Download	☑	☑	☑

- Click **Browse** then navigate to the Protege GX installation directory. By default, this is **C:\Program Files\Integrated Control Technology\Protege GX**.

- Add the following executables one by one:
  - GXSV.exe
  - GXSV2.exe
  - GXSV3.exe
  - GXEvtSvr.exe
  - GXDVR1.exe
  - GXDVR2.exe

  This allows access through the Windows Firewall to all Protege GX services.



Add a Program

Select the program you want to add, or click Browse to find one that is not listed, and then click OK.

Programs:

- Protege GX Client
- Protege GX Service Manager
- Reporting Services Configuration Manager
- SmartDraw 2013
- SmartDraw 2013 Uninstall
- SoloBug
- SQL Server Error and Usage Reporting
- SQL Server Installation Center
- SQL Server Installation Center
- SQL Server Management Studio
- TestTrack Pro Client

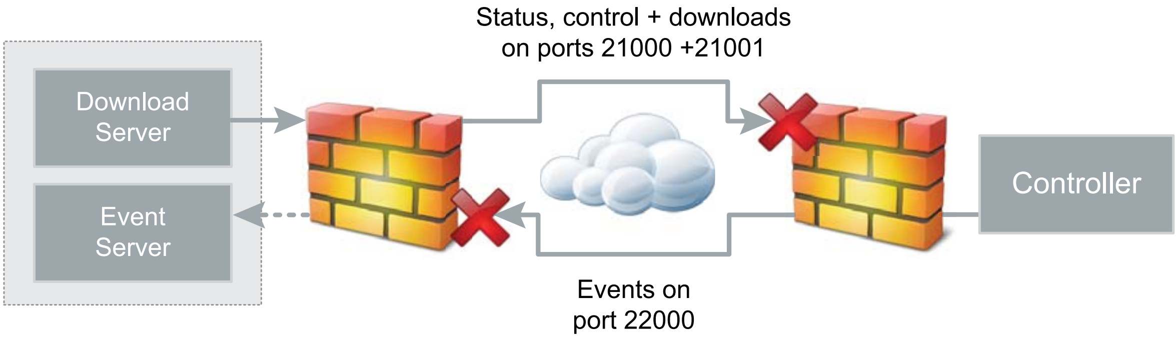
Path: C:\Program Files\Integrated Control Technolo

What are the risks of unblocking a program?

You can choose which network location types to add this program to.

Multiple Firewalls

On corporate networks, there can be multiple firewalls.

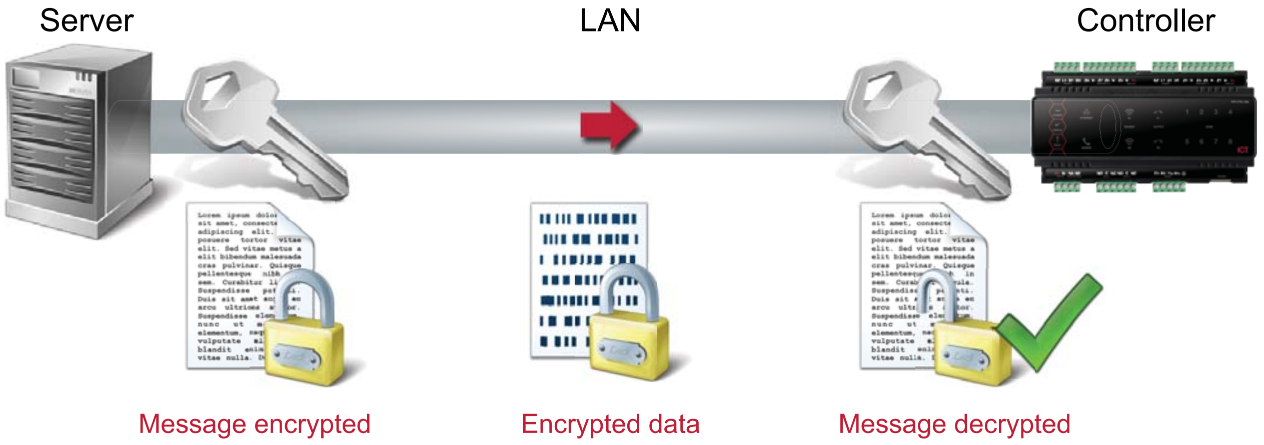


To ensure these are configured correctly, pass the **Protege GX Network Administrators Guide** to the appropriate IT staff member.

This document is included with the software installation pack.

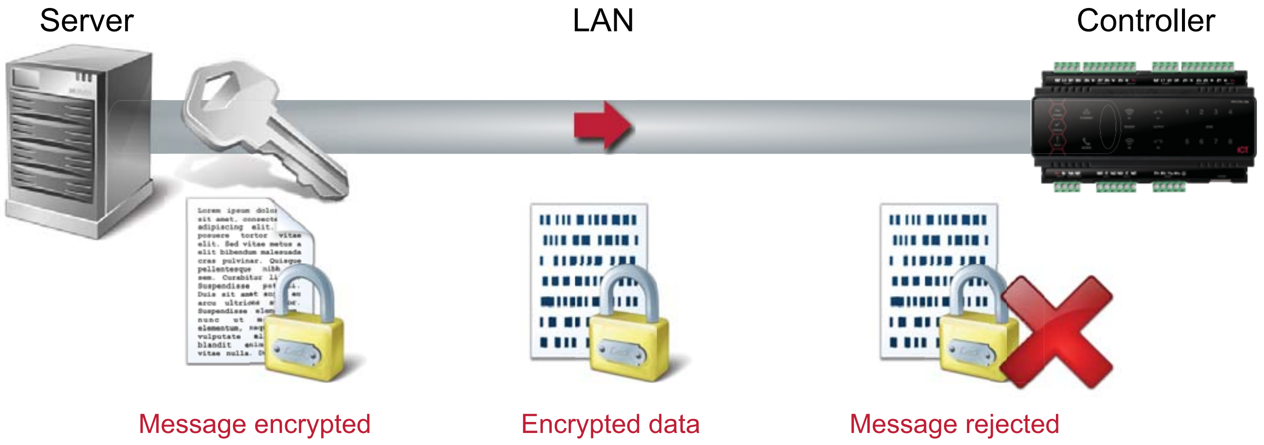
Encryption

Encryption relies on a shared key that **both** the sender and receiver of a message know. The message is encrypted using the key, then decrypted by the receiver using the same key.

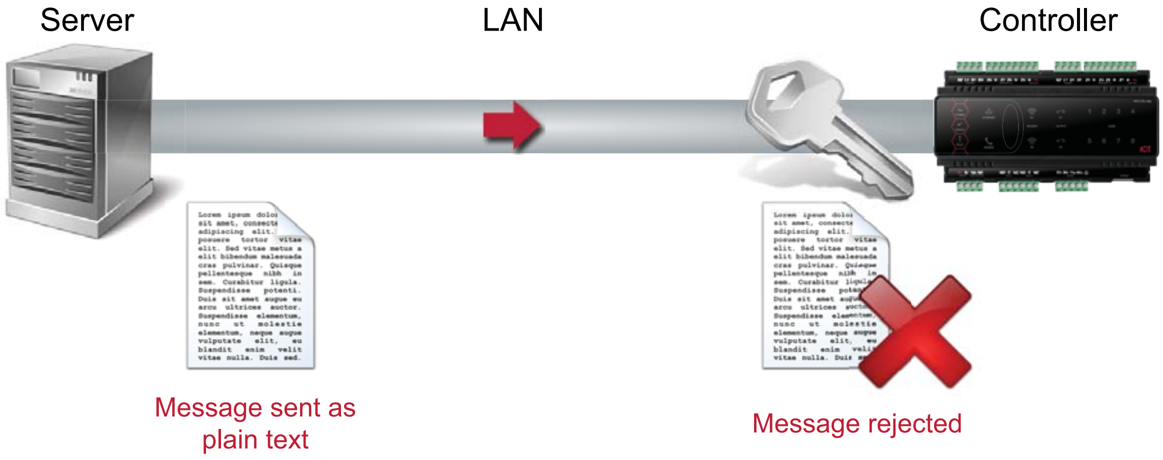


If the message is intercepted it will make no sense to anyone without the key.

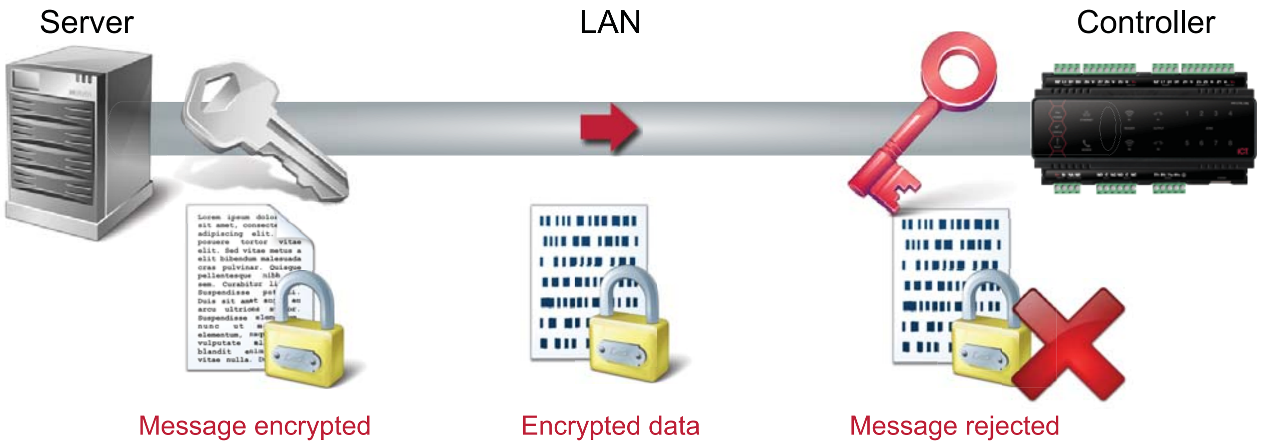
If for some reason the receiver loses the key, then it will be unable to decrypt incoming messages. In this case the message is **rejected**:



If the **sender** loses the key then the message will be sent in plain text. The receiver - expecting to receive encrypted events - will also **reject** these messages as they may be of a malicious nature:



If the sender and receiver have **different** keys then the message will still not be able to be decrypted by the receiver. This also results in the receiver **rejecting** the incoming messages:

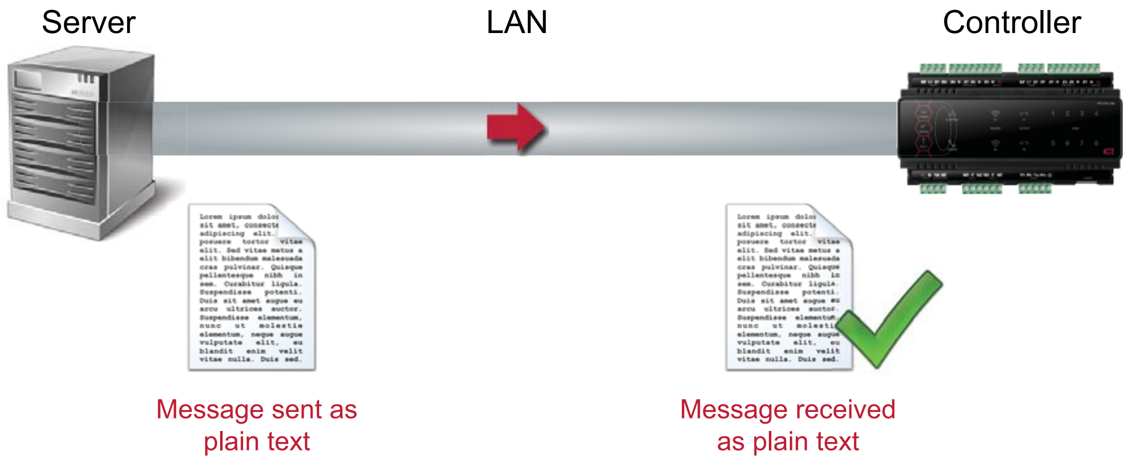


Every time encryption is enabled at the server, it generates a new encryption key:

- Each controller will have a unique key, independent from all other controllers
- If encryption for a controller is disabled, then enabled again, the key is changed
- If encryption for a controller is disabled at the server, the controller must be defaulted

  It is not possible to re-enable encryption without first defaulting the controller

If encryption is disabled at **both** the sender and receiver then messages received will be accepted.



The downside of this scenario is that anyone 'listening' between the sender and receiver can also receive the messages.

Encryption Summary

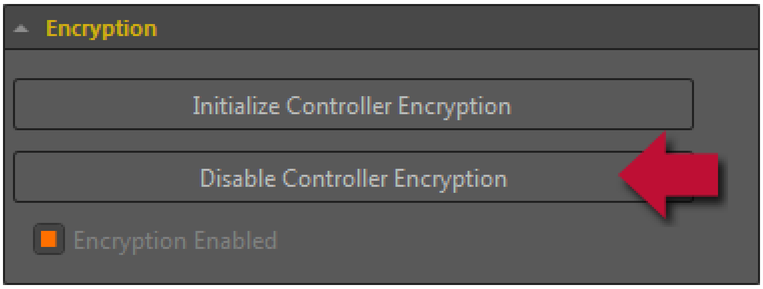
- The server issues a different key each time it negotiates encryption with a controller
- Encryption can be enabled for one controller and disabled for another
- If both the server and controller have encryption disabled, communications are possible
- If both the server and controller have encryption enabled and the keys match, communications are possible
- If the server has encryption enabled but the controller does not, communications are **not** possible
- If the server does not have encryption enabled but the controller does, communications are **not** possible
- If the server and controller both have encryption enabled but the keys do not match, communications are **not** possible

Disabling Encryption

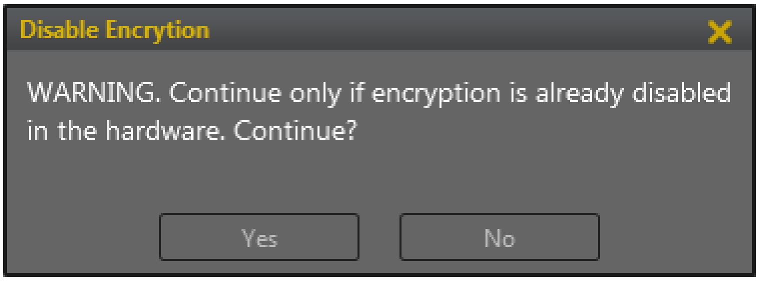
Defaulting the controller is the only way to remove the encryption key.

This is by design and intended as a security feature. It means that physical access to the controller must be gained before encryption can be disabled.

If the controller is defaulted, encryption must be disabled at the server before communications can be established. This is done in the controller configuration tab.


Encryption
Initialize Controller Encryption
Disable Controller Encryption
Encryption Enabled

The software will warn you prior to disabling encryption. Once this has been done, the Controller must be defaulted to clear the encryption key.



WARNING. Continue only if encryption is already disabled in the hardware. Continue?

If you are unsure of the state of encryption of either the Server or Controller, disable it at the Server then default the Controller. This will ensure that neither are currently encrypted and will rule this out as a cause of communications problems. Encryption should then be enabled once communications are established.

Duplicate IP or Serial Number

Although the software will warn you, it is possible to save two controllers with the same IP or serial number.

- In this case, the controller that was created first will take priority.
- Confirm that you haven't created a controller with a duplicate IP or serial number. Check all of your sites.
- If you have created a site for templates, these should be left with zero IP addresses and serial numbers.

If you have two controllers with the same IP address or serial number anywhere on your server, there will be communication problems with at least one of them.

Confirm Ports

Ensure that the ports that have been set on your controller match those configured at the server.

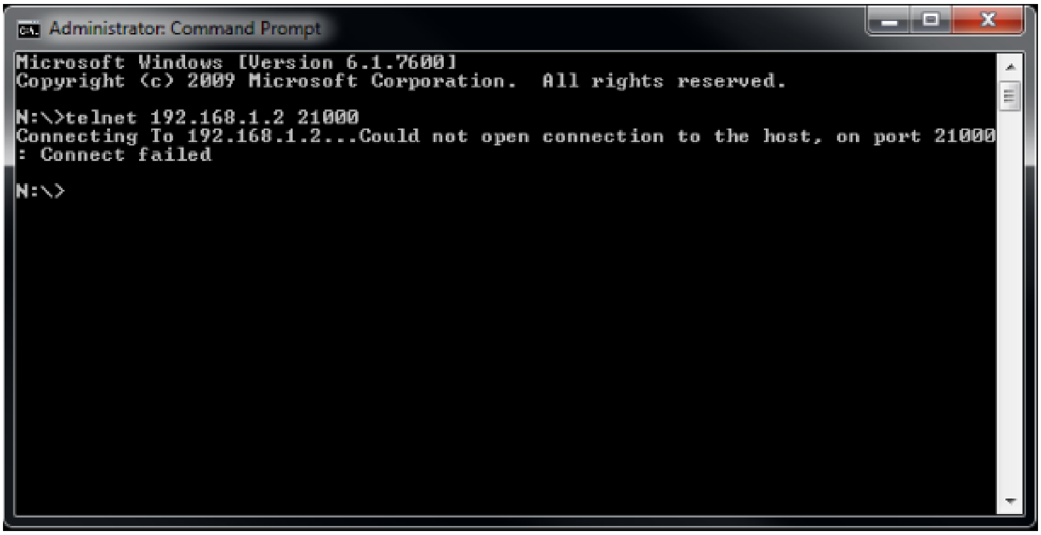
- The event server port is set under Global | Event Server. This is the only place it is configured.
- The download and control ports are set for each controller on the general tab.
- Compare these with what is set at your controller. Use the web interface for the DIN Controller or Telnet for the PCB Controller.

If you have changed any settings on the controller, you will need to save your changes and restart the controller for the changes to take effect.

To confirm that a network path exists from the Server to the Controller and that the correct port are open, Telnet to the Controller (regardless of whether it is DIN or PCB) on port 21000.
For example: telnet 192.168.1.2 21000

If the Controller is able to accept the connection, you will get a clear screen with a cursor blinking in the top left corner.

If you do not get a connection, you will see a message similar to that shown here:



```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

N:\>telnet 192.168.1.2 21000
Connecting To 192.168.1.2...Could not open connection to the host, on port 21000
: Connect failed

N:\>
```

If this is the case, there is still a problem between the server and controller. If you are able to web browse to the controller then it is very likely that a firewall is blocking the connection somewhere.

Finally, to confirm that the event server is able to accept connections, configure a laptop with the same IP settings as the controller.

- Remove the Ethernet plug from the controller and plug in your laptop
- Try to telnet to the server IP address on the event server port (22000 by default):

```
telnet 192.168.1.100 22000
```

If the server is able to accept connections, you will get the clear screen and blinking cursor.

If the server is not reachable, you will see a similar message to that shown on the previous slide. Once again, this would indicate that a firewall is blocking port 22000 to the server.

Requesting Technical Support

If all of the above options have been exhausted, contact ICT Technical Support.

Make sure you have the results of all of your tests at hand.

If it is possible to get internet access on the Server, a remote support session can be initiated.

Review Questions

A module update is required when...

□ You change any settings on the expander

□ You change any programming

□ The Controller advises it is required via the health status

□ All of the above

What does the Controller Wizard do?

□ Adds a Controller

□ Adds expanders, inputs, outputs, trouble inputs

□ Links all of the associated records

□ All of the above

What steps are required to use the Controller onboard reader ports?

□ None. Door processing is enabled by default

□ Assign a Reader Expander address in the Controller Configuration tab and select the lock outputs to use

□ Assign a Controller address in the Reader Expander Configuration tab and select the lock outputs to use

□ Turn DIP switch 4 on

What does it mean if an address is shown in red in the Auto- Addressing window?

□ The address has been changed but not updated

□ The address can't be changed using Auto-Addressing

□ The address is outside the Controllers address space

□ The address is at factory default of 254

Which of the following will generate a Controller Health Status message?

□ A low battery on a power supply

□ Failure to communicate

□ When encryption is disabled

□ All of the above

If Controller encryption is accidentally disabled, what additional step must be carried out to get the Controller back online?

- □ The Controller must be defaulted to clear the encryption key
- □ Controller encryption should be enabled again
- □ Controller encryption should be initialized again
- □ Nothing. If encryption is disabled at the Server, the Controller will continue to communicate

Answer the following...

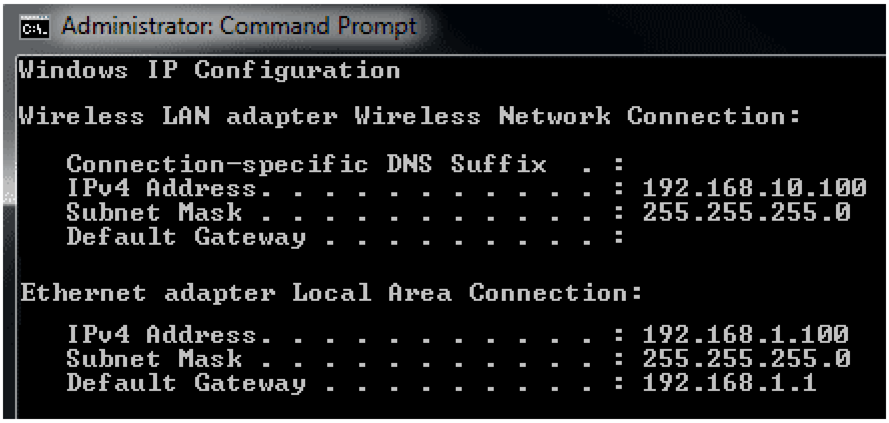
On a site where encryption between the Controller and Server is normally enabled, a Controller is defaulted. The Controller does not come back online.

What additional step must be carried out to get the Controller back online?

- □ Encryption must be disabled for the Site
- □ Encryption must be re-initialized on the Controller
- □ Encryption must be disabled for the Controller
- □ A force download is required to push the existing encryption key out to the Controller

What is the correct Event Server IP address?

Assuming the screenshot shown is from the Protege GX Server.



Administrator: Command Prompt

```
Windows IP Configuration

Wireless LAN adapter Wireless Network Connection:

   Connection-specific DNS Suffix  . :
   IPv4 Address. . . . . . . . . . . : 192.168.10.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Ethernet adapter Local Area Connection:

   IPv4 Address. . . . . . . . . . . : 192.168.1.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

What should a Controller with the IP address 192.168.10.2 have set as its Event Server IP address?

- □ 192.168.10.1
- □ 192.168.10.100
- □ 192.168.1.1
- □ 192.168.1.100

Module 132: User Management

This module takes you through creating users and access levels, and using schedules to control how and when users gain access.

In This Module

Managing Users

A **User** is a person that requires access to the facility being controlled by the access control system. They identify themselves to the system using credentials such as access cards, PIN and biometric profiles.

Once a user has been added, they can then be assigned access to doors, areas, elevator floors and menu groups via **Access Levels**.

Training Exercise

Throughout the rest of the programming modules, you will be guided through setting up a basic system. Follow the instructions in this workbook to create your Acme Engineering site. Review questions will be based on what you have set up on your system.

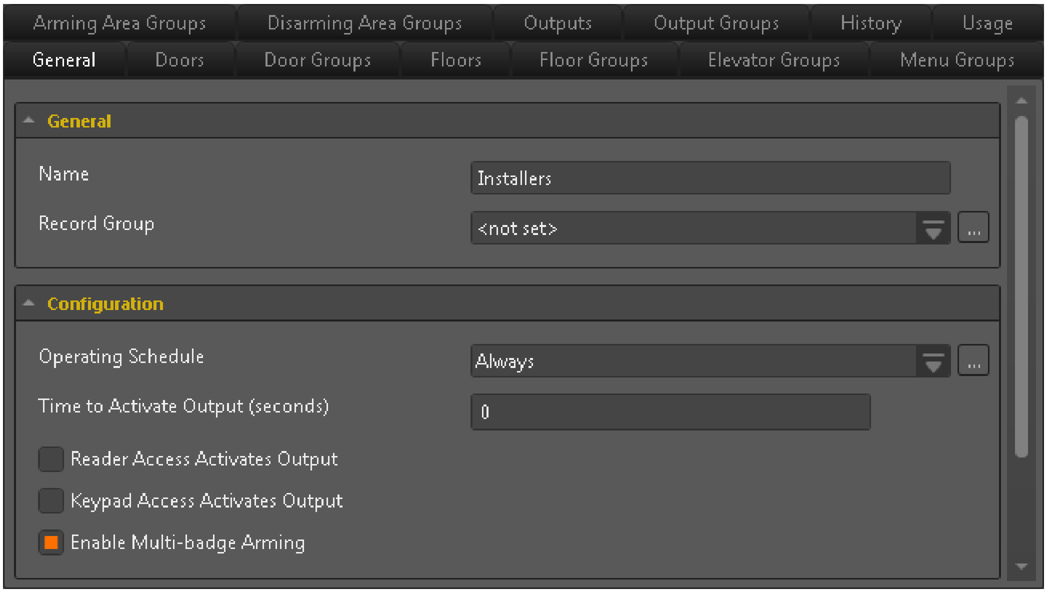
Access Levels

Access Levels are used to control **what** users can do, **where** they can go, and **when** they can do these things. They determine the **doors**, **areas**, **elevator floors** and **menu groups** a user has access to. The tidiest way to define this access is using **groups**

Creating an Access Level

We'll spend more time on access levels later, but for now we are going to create a new access level for our installers, with full access to the system:

1. Navigate to **Users | Access Levels** and click **Add**
2. Enter a name for the access level - we'll use **Installers** - and click **Save**



General

Name: Installers

Record Group: <not set>

Configuration

Operating Schedule: Always

Time to Activate Output (seconds): 0

□ Reader Access Activates Output

□ Keypad Access Activates Output

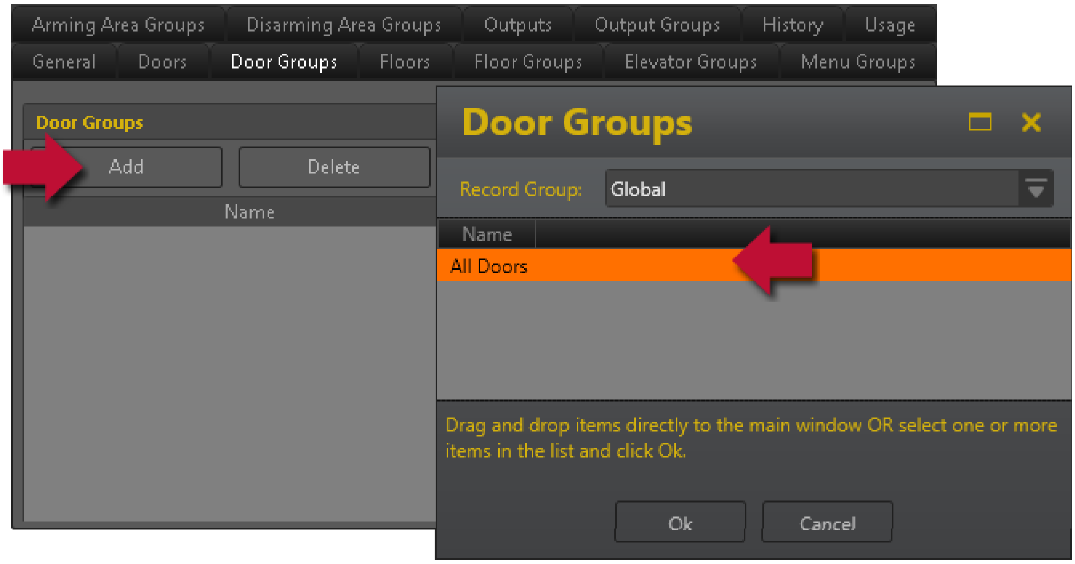
☑ Enable Multi-badge Arming

Door Groups

Doors and Door Groups define which doors a user has access to. By default, Protege GX has a door group called All Doors that allows access to all doors, all of the time. When a new door is created, it is automatically assigned to this All Doors group.

Adding a Door Group to an Access Level

1. Select the Door Groups tab and click Add



Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

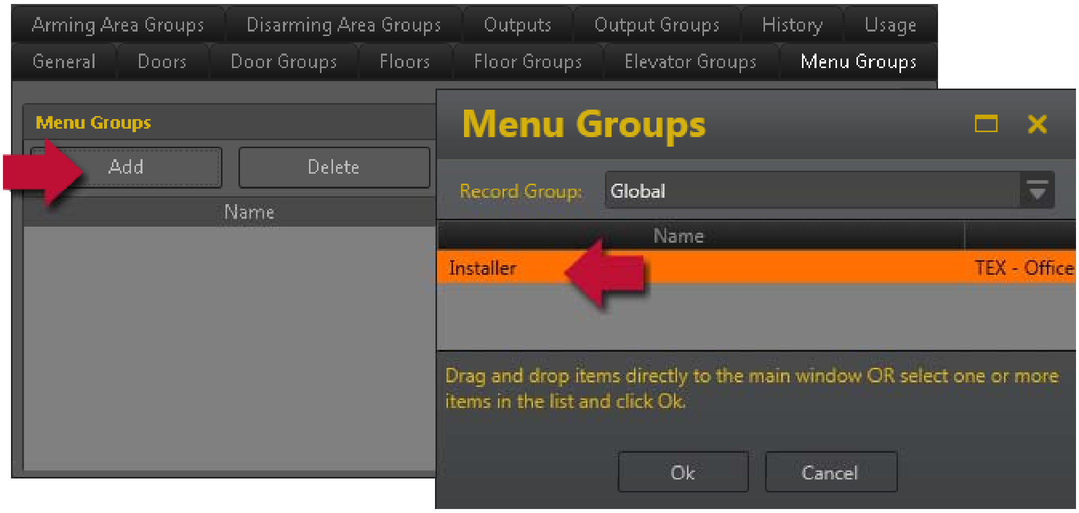
2. Select the All Doors group and click OK

Menu Groups

Menu groups control access to keypads. They define what a user can do at a keypad, but not which areas the user has access to. When we used the Add Controller Wizard, we created an Installer menu group for our new controller. This provides access to all keypad menus. Menu groups must be created for every controller.

Adding a Menu Group to an Access Level

1. Select the Menu Groups tab and click Add



Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

2. Select the Installer group and click OK.

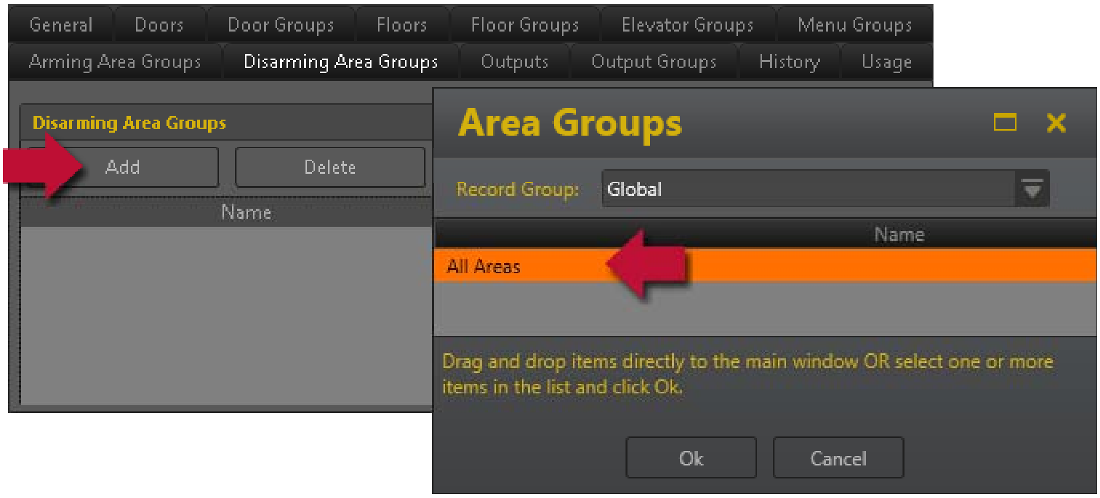
Arming and Disarming Area Groups

Arming Area Groups and Disarming Area Groups control which areas a user is allowed to arm or disarm. Protege GX has a default Area Group called All Areas. This allows access to all areas, all of the time. When a new area is created, it is automatically assigned to the All Areas group.

If an Access Level contains an Area Group in the Disarming Area Groups tab, it will also allow arming of that Area Group. It is assumed that a user that is allowed to disarm an area should also be allowed to arm that area.

Adding a Disarming Area Group to an Access Level

1. Select the Disarming Area Groups tab and click Add



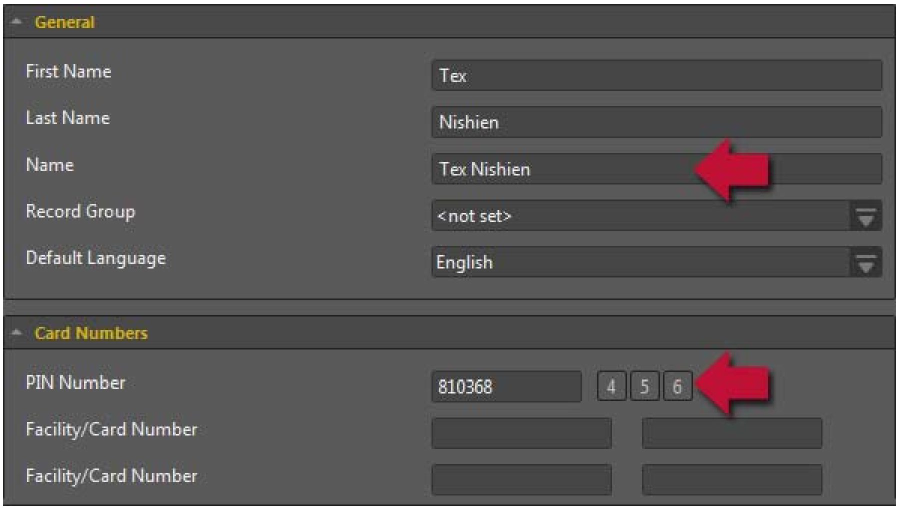
Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

2. Select the All Areas group and click OK.
3. Click Save to finish creating the access level

Creating a User

Now that we have our installer access level, we need to create a user:

1. Navigate to **Users | Users** and click **Add**
2. Enter a **First Name** and **Last Name** for the user. Because we have set our global options to use the long format, the **Name** is populated automatically



General

First Name	Tex
Last Name	Nishien
Name	Tex Nishien
Record Group	<not set>
Default Language	English

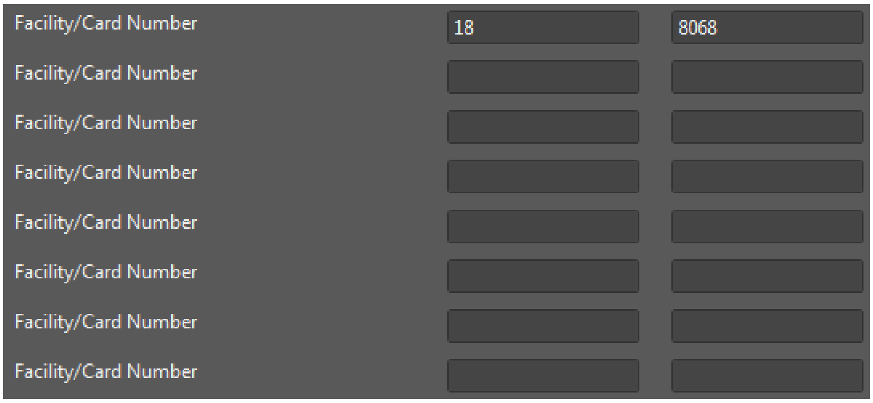
Card Numbers

PIN Number	810368	4 5 6
Facility/Card Number		
Facility/Card Number		

3. Enter a **PIN** or use the **[4] [5]** or **[6]** button to automatically generate a random pin number between 4 and 6 digits in length. For now, we'll set the PIN to **000000** so we can remember it easily. This should be changed once we have finished programming the site.

Adding Cards

Each user can have up to 8 cards in Protege GX:



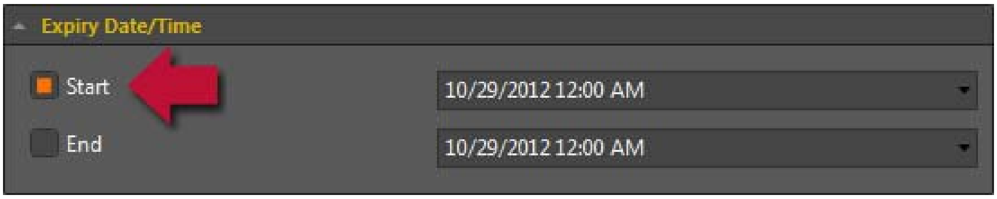
Facility/Card Number	18	8068
Facility/Card Number		
Facility/Card Number		
Facility/Card Number		
Facility/Card Number		
Facility/Card Number		
Facility/Card Number		
Facility/Card Number		

Cards can be entered manually by typing in the facility code and card number into one of the available fields.

There are alternative methods of adding cards which we will look at a little later.

User Expiry

Users can be set to expire by checking the Start and/or End options and setting a date and time:



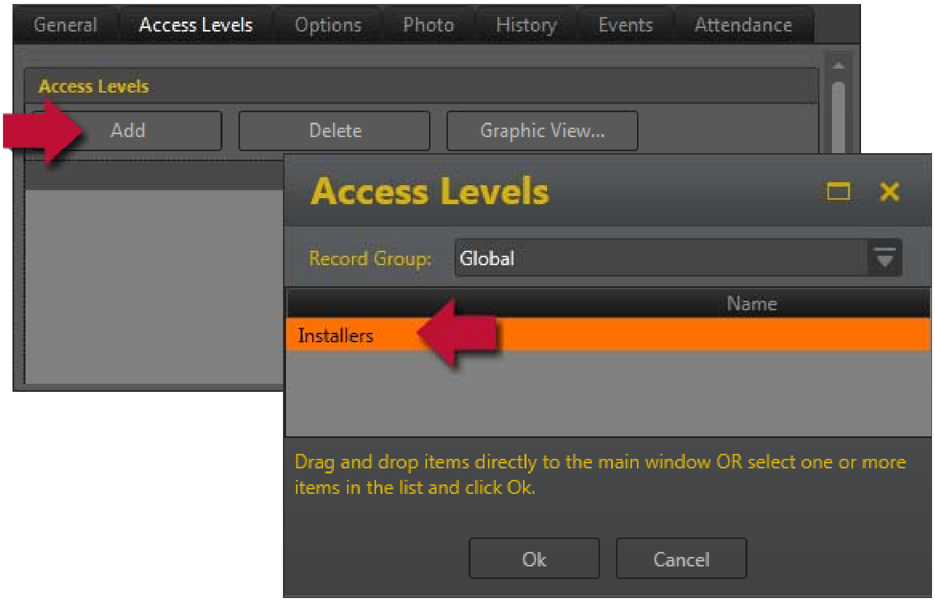
☑ Start 10/29/2012 12:00 AM

□ End 10/29/2012 12:00 AM

This allows cards to be issued and sent out prior to access being enabled, and allows for a users access to be stopped on a certain date.

Adding an Access Level to a User

1. Select the Access Levels tab and click Add



Record Group: Global

Installers

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

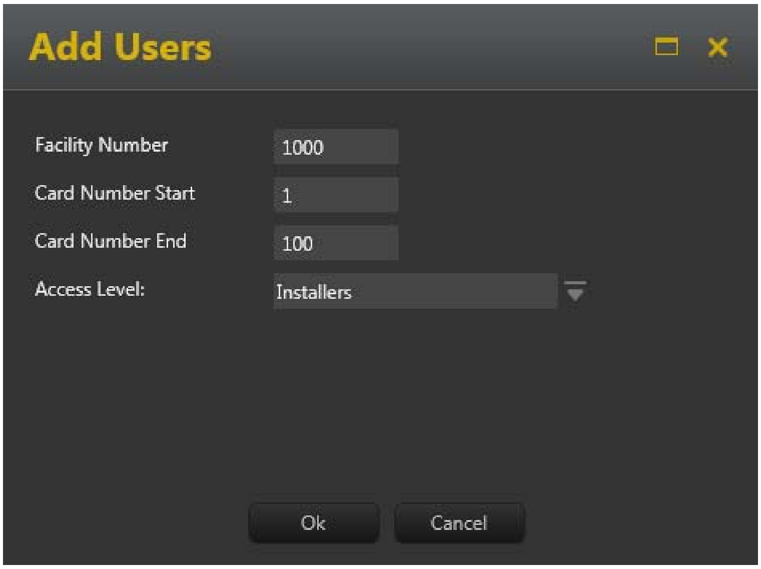
2. Select the Installers access level and click OK
3. Click Save to finish configuring the new user.

Users can have multiple access levels. If using a PCB controller, remember there is a limit of 4 access levels per user.

Batch Adding Users

The **Batch Add Users** feature enables you to automatically create a number of user records with an assigned facility and range of card numbers. Use this feature when you have a large number of cards to add to the system.

1. Navigate to **Sites | Batch Add Users**



Add Users

Facility Number: 1000

Card Number Start: 1

Card Number End: 100

Access Level: Installers

2. Enter the **Facility Number**, the **Card Number** range (first and last card number to be entered), and the **Access Level** to be assigned to the users
3. Click **OK.** The user records are created, ready to enter names and additional user details.

Deleting Users

You can easily delete user records that are no longer required. Simply select the record(s) to be deleted, then click the **Delete** button on the toolbar

Use multi select to delete multiple users in one action. Select the first user and hold down the CTRL key while selecting specific records, or hold the SHIFT key while selecting a block of users. Once the required users are selected, click **Delete.**

We'll delete all the users we created using the batch add function now:

1. Click on any user then use **CTRL + A** to select the entire list of users.
2. Hold down the CTRL key and click once on the first user to deselect the Installer record.

   You should have all other users apart from the Installer selected.
3. Click the **Delete** button on the main toolbar.

   This should leave you with only the Installer user.

Importing Users from a CSV File

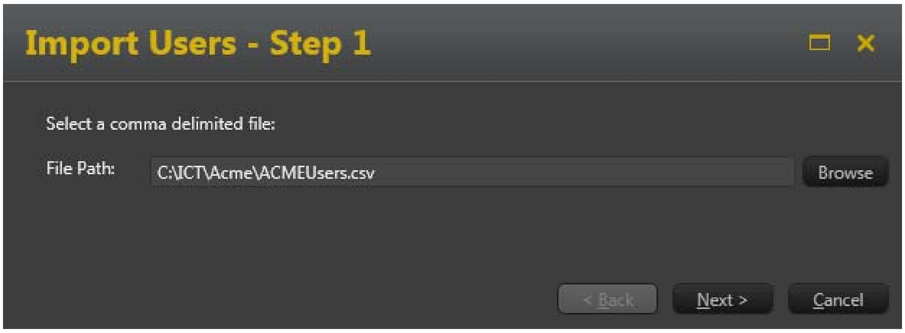
It's not unusual to have hundreds of users that need to be loaded into the system. Entering the data manually can be tedious and time consuming, and data entry is often prone to human error.

Many organizations already have some form of data source - such as an HR system or a student enrolment database - containing user information. Most of these systems enable you to easily export this data as a CSV file or even an Excel spreadsheet.

The **Import Users** wizard enables you to transfer that user data into Protege GX, mapping the user information to the corresponding fields in Protege GX.

1. Navigate to **Sites | Import Users** to launch the Import Users wizard
2. Browse to and select the CSV File you wish to import the users from, then click **Next**

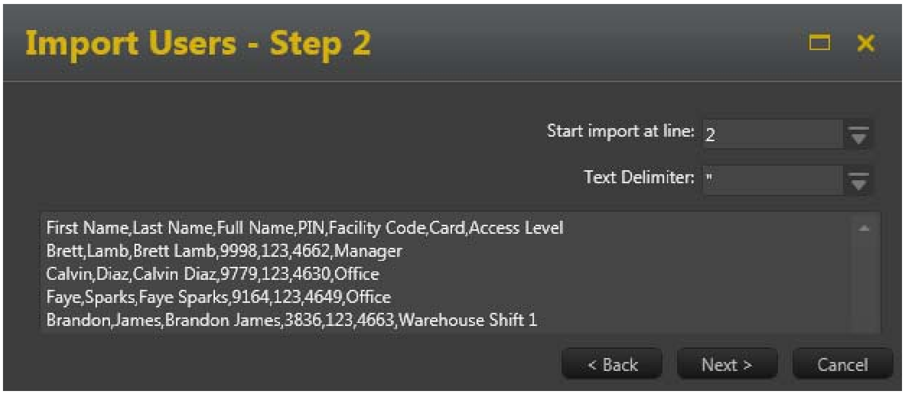
   For our Acme training system, use the CSV file provided on your USB training card.



Select a comma delimited file:

File Path: C:\ICT\Acme\ACMEUsers.csv

3. Select the line to start importing data from. If your CSV file contains a header row, start the import at **line 2** so the header row is not imported
4. Select the text delimiter to use, then click **Next**

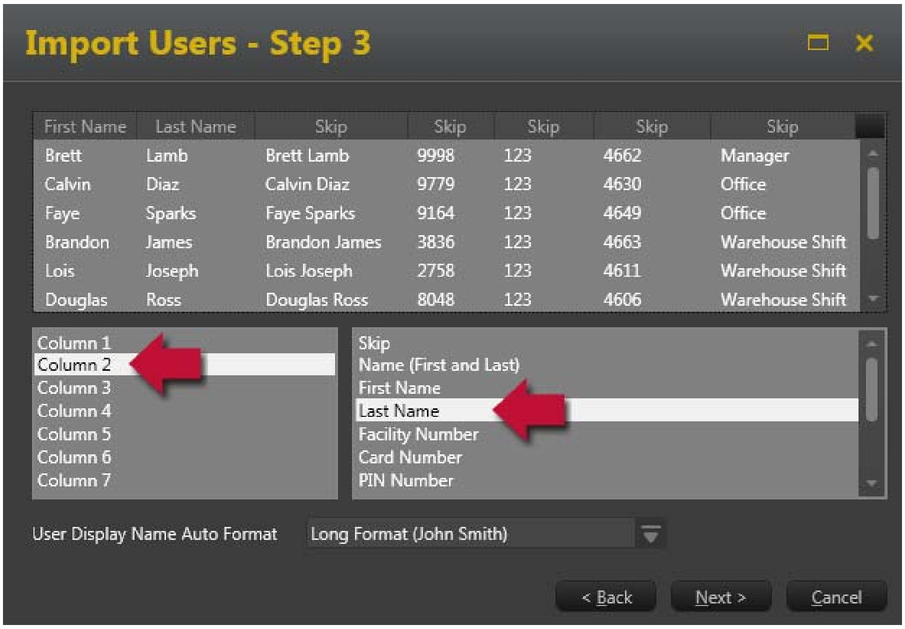


Start import at line: 2

Text Delimiter: "

```
First Name,Last Name,Full Name,PIN,Facility Code,Card,Access Level
Brett,Lamb,Brett Lamb,9998,123,4662,Manager
Calvin,Diaz,Calvin Diaz,9779,123,4630,Office
Faye,Sparks,Faye Sparks,9164,123,4649,Office
Brandon,James,Brandon James,3836,123,4663,Warehouse Shift 1
```

5. Select a column in the panel on the left then click the associated field on the right that the data should be mapped to.
6. Repeat for the remaining columns, selecting Skip where you want to ignore a column. This allows you to import from a CSV containing additional data without having to edit the file first. The data in the top panel is updated as you make your selections enabling you to preview how fields will be imported.



First Name	Last Name	Skip	Skip	Skip	Skip	Skip
Brett	Lamb	Brett Lamb	9998	123	4662	Manager
Calvin	Diaz	Calvin Diaz	9779	123	4630	Office
Faye	Sparks	Faye Sparks	9164	123	4649	Office
Brandon	James	Brandon James	3836	123	4663	Warehouse Shift
Lois	Joseph	Lois Joseph	2758	123	4611	Warehouse Shift
Douglas	Ross	Douglas Ross	8048	123	4606	Warehouse Shift

Column 1
Column 2
Column 3
Column 4
Column 5
Column 6
Column 7

Skip
Name (First and Last)
First Name
Last Name
Facility Number
Card Number
PIN Number

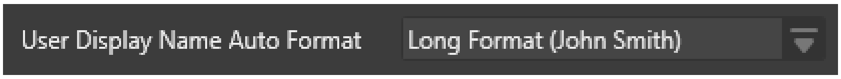
User Display Name Auto Format: Long Format (John Smith)

For our Acme training system, we'll map the columns as follows:

- Column 1 = First Name
- Column 2 = Last Name
- Column 3 = Skip (we'll use the Auto Format function instead)
- Column 4 = PIN Number
- Column 5 = Facility Number
- Column 6 = Card Number
- Column 7 = Access Level

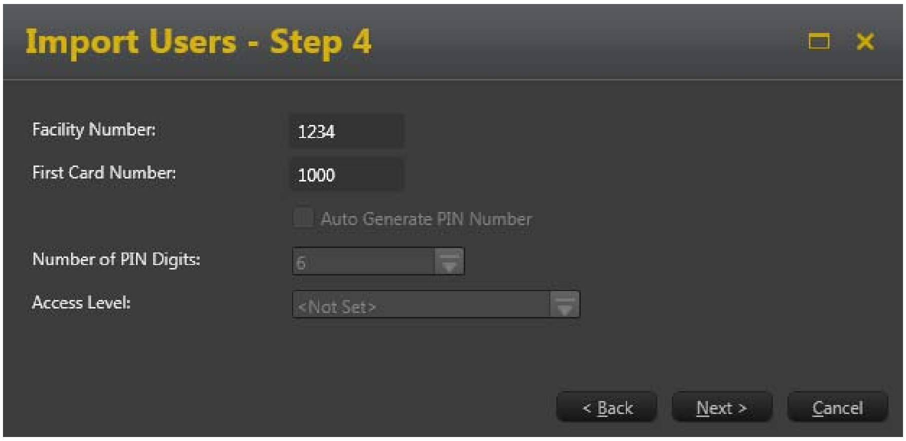
When mapping to an access level that does not yet exist, it will be created during the import

7. Set the User Display Name option to **Long Format**:



User Display Name Auto Format: Long Format (John Smith)

8. Click **Next** to continue.
9. If you have not mapped a Facility, Card Number, or Access Level, you can assign these now. You can also choose to generate PIN numbers automatically if these have not been mapped.



Import Users - Step 4

Facility Number: 1234

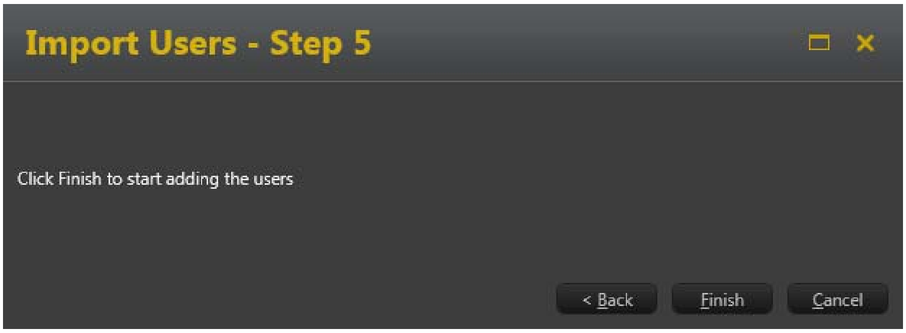
First Card Number: 1000

☐ Auto Generate PIN Number

Number of PIN Digits: 6

Access Level: <Not Set>

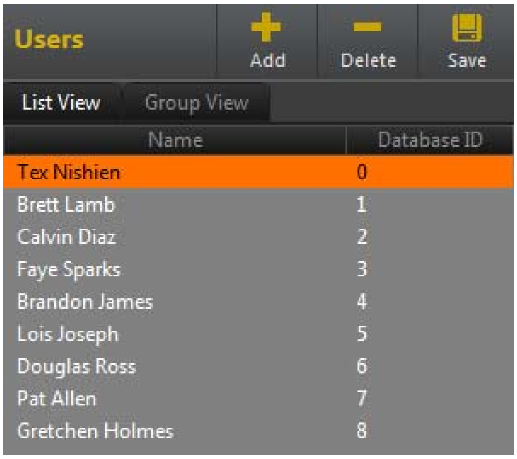
10. Click **Next** to continue.
11. Click **Finish** to start the import process.



Import Users - Step 5

Click Finish to start adding the users

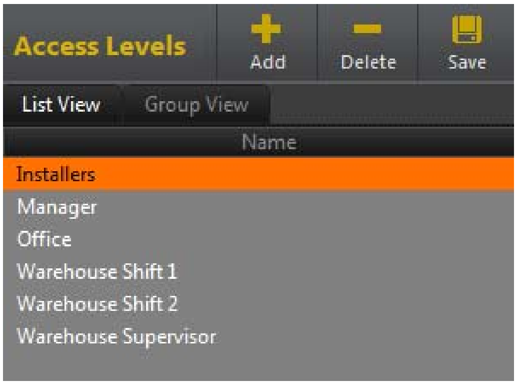
12. If the imported users are not showing up, navigate away from the Users page, then back again.



Name	Database ID
Tex Nishien	0
Brett Lamb	1
Calvin Diaz	2
Faye Sparks	3
Brandon James	4
Lois Joseph	5
Douglas Ross	6
Pat Allen	7
Gretchen Holmes	8

You should now have a list of users something like that shown above.

13. Navigate to Users | Access Levels.



Name
Installers
Manager
Office
Warehouse Shift 1
Warehouse Shift 2
Warehouse Supervisor

The Import function has created all of the access levels from our CSV file. We will still need to configure these, but time has been saved in creating, naming and assigning them to users.

During the CSV import, access levels that don't already exist will be created, but any existing access levels will remain intact.

Schedules

Schedules are definitions of timeframes. They can be programmed to:

- Have multiple start and stop times
- Work on some days, but not others
- Span multiple days
- Operate differently on holidays
- Be qualified by an output state

Uses

Schedules are used to:

- Control **when** a user can gain access to things
- Unlock doors automatically
- Arm or disarm Areas at certain times or days
- Turn things on and off at particular times or days
- Change how things behave at certain times or days

States

Once a schedule is programmed and active, it will always be in one of two states: **valid** or **invalid**.

When a schedule becomes valid, items that are programmed to depend on that schedule will become active. For instance:

- An Access Level will only grant access when its **operating schedule** is valid
- A door will unlock when its **unlock schedule** becomes valid
- An output will turn on when its **activation schedule** becomes valid

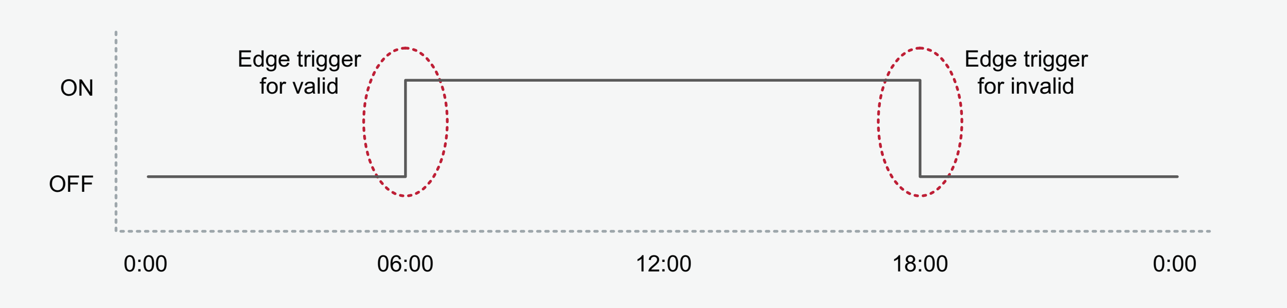
Validation

When a user tries to gain access to something, the schedule is checked at that time.

- If the schedule is **valid**, access will be **granted**
- If the schedule is **invalid**, access will be **denied**

Edge Triggering

Things that are programmed to change when a schedule changes are deemed to be edge triggered. This means that by default, they are only checked and changed when the schedule changes state.



Edge triggering for a schedule programmed with a start time of 06:00 and an end time of 18:00

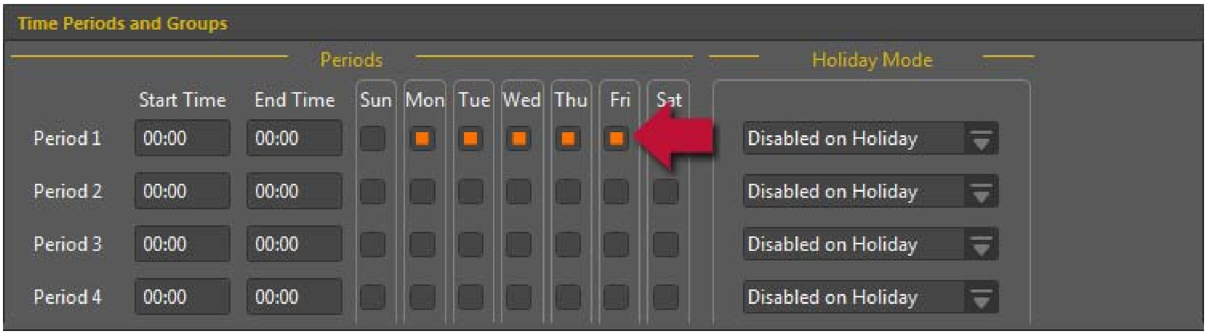
For example, if a door is programmed to unlock by a schedule, then it will only unlock at the point that the schedule becomes valid.

If at 10:00am, you assigned this schedule to a door's unlock schedule, then that door will not unlock until 06:00am the following morning. This is because the trigger that unlocks the door is the edge trigger that only occurs when the schedule changes from invalid to valid.

Creating Your First Schedule

Based on our training system specifications, we are going to create a new schedule for Office Hours, which will be valid from 9am to 5pm, Monday through Friday

- Navigate to Sites | Schedules and click Add
- Enter a name for the schedule
- Start by checking the Monday through Friday boxes of period 1

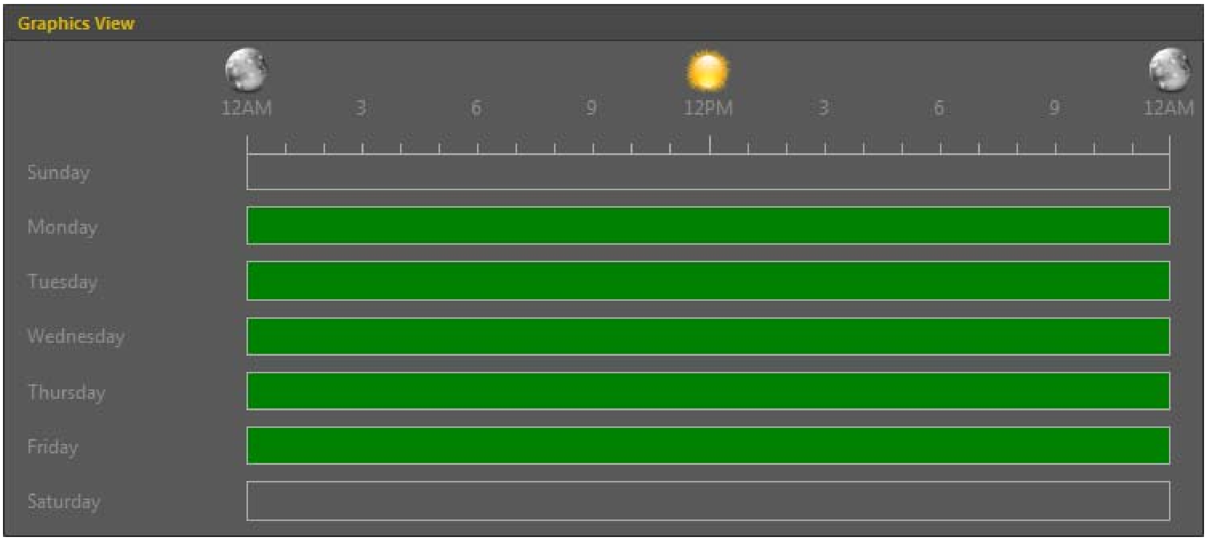


Time Periods and Groups

Periods — Holiday Mode

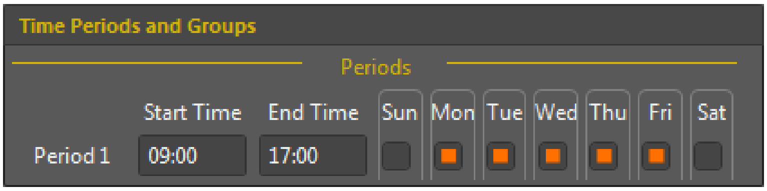
	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Period 1	00:00	00:00	□	☑	☑	☑	☑	☑		Disabled on Holiday
Period 2	00:00	00:00	□	□	□	□	□	□	□	Disabled on Holiday
Period 3	00:00	00:00	□	□	□	□	□	□	□	Disabled on Holiday
Period 4	00:00	00:00	□	□	□	□	□	□	□	Disabled on Holiday

- Notice how the **Graphics View** updates to show green bars for these days. These green bars show when the schedule will be valid.



- Now, double click the hours of the **Start Time** and enter **9:00**

  Notice how the **Graphics View** updates immediately
- Try using the up and down arrow keys and observe how the hours change in response
- Enter the End Time of **17:00**



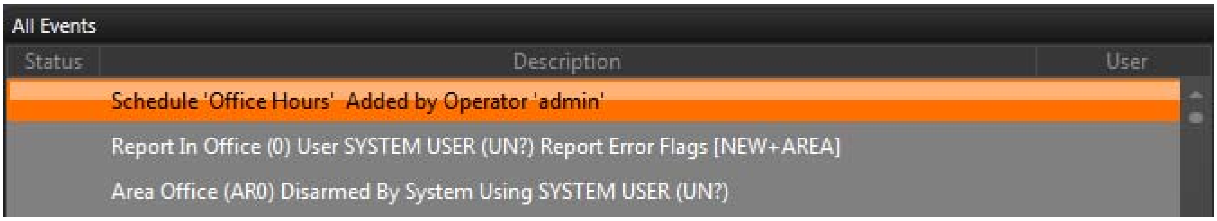
Time Periods and Groups

Periods

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Period 1	09:00	17:00	□	☑	☑	☑	☑	☑	□

- Note the effect on the **Graphics View**
- **Save** the schedule

  You should see some operator events coming up in your **All Events** window:



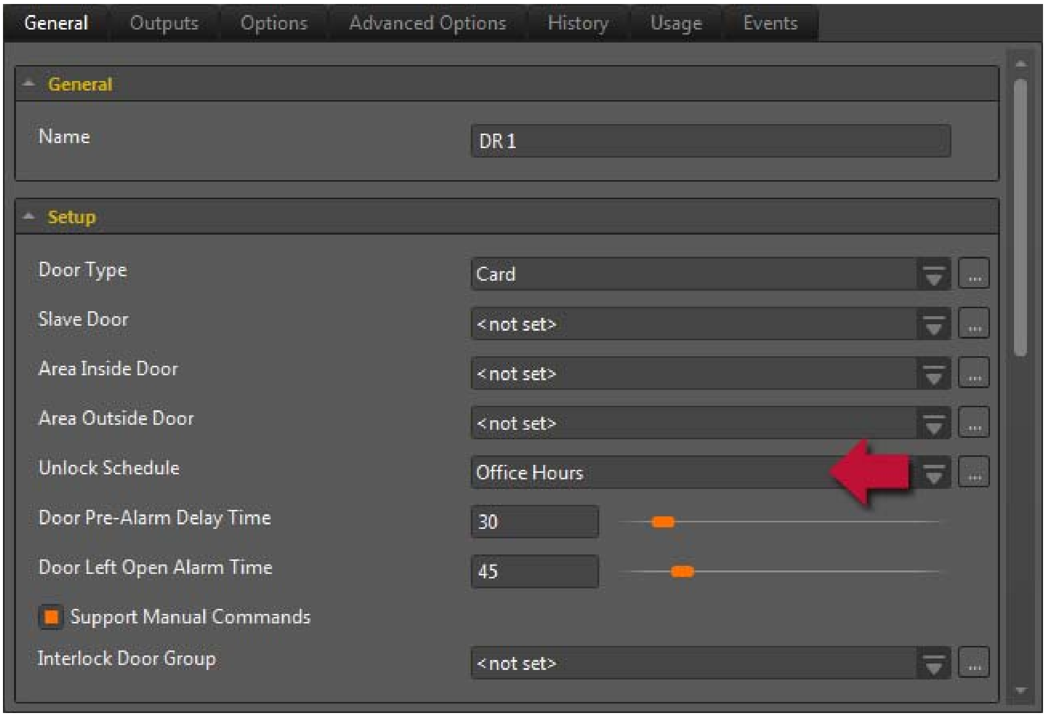
All Events

Status	Description	User
	Schedule 'Office Hours' Added by Operator 'admin'	
	Report In Office (0) User SYSTEM USER (UN?) Report Error Flags [NEW+AREA]	
	Area Office (AR0) Disarmed By System Using SYSTEM USER (UN?)	

At this point, your controller has not been made aware of this schedule. The download server will only send this schedule to the controller once a device or access level on the controller needs to know about it.

Adding an Unlock Schedule to a Door

- Navigate to Programming | Doors and select DR 1
- Set the Unlock Schedule to the newly created Office Hours schedule



General

Name: DR 1

Setup

Door Type: Card

Slave Door: <not set>

Area Inside Door: <not set>

Area Outside Door: <not set>

Unlock Schedule: Office Hours

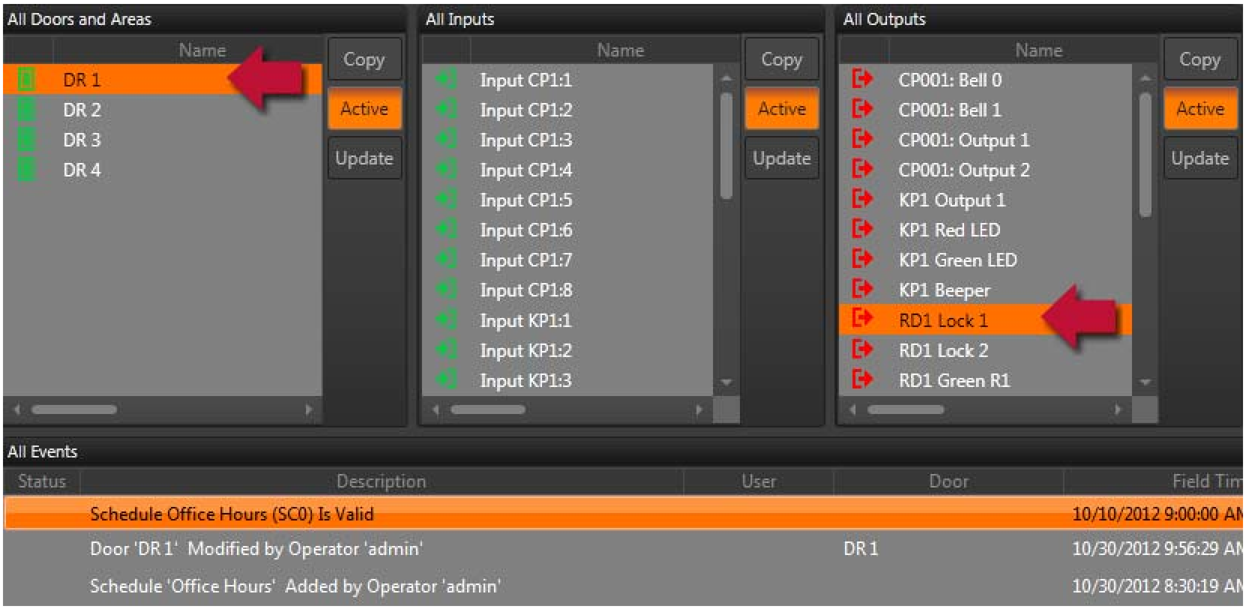
Door Pre-Alarm Delay Time: 30

Door Left Open Alarm Time: 45

■ Support Manual Commands

Interlock Door Group: <not set>

- Once the download server has pushed out the new configuration, you should see something like this in your All Events window



All Doors and Areas

Name
DR 1
DR 2
DR 3
DR 4

All Inputs

Name
Input CP1:1
Input CP1:2
Input CP1:3
Input CP1:4
Input CP1:5
Input CP1:6
Input CP1:7
Input CP1:8
Input KP1:1
Input KP1:2
Input KP1:3

All Outputs

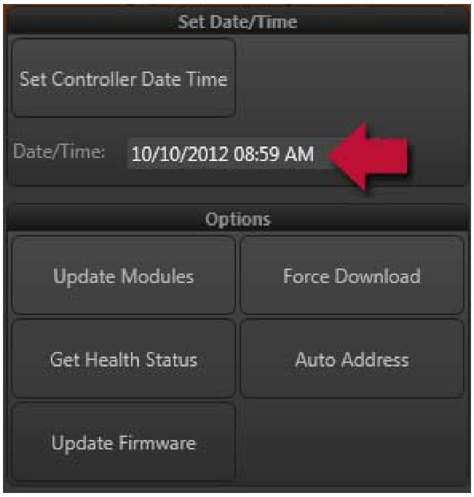
Name
CP001: Bell 0
CP001: Bell 1
CP001: Output 1
CP001: Output 2
KP1 Output 1
KP1 Red LED
KP1 Green LED
KP1 Beeper
RD1 Lock 1
RD1 Lock 2
RD1 Green R1

All Events

Status	Description	User	Door	Field Tim
	Schedule Office Hours (SC0) Is Valid			10/10/2012 9:00:00 AM
	Door 'DR 1' Modified by Operator 'admin'		DR 1	10/30/2012 9:56:29 AM
	Schedule 'Office Hours' Added by Operator 'admin'			10/30/2012 8:30:19 AM

Because the schedule hasn't gone through a state change, there should be no effect on the state of the door yet. Notice that DR 1 is locked, and the lock output is off.

- Navigate to Sites | Controllers, then right click on your controller

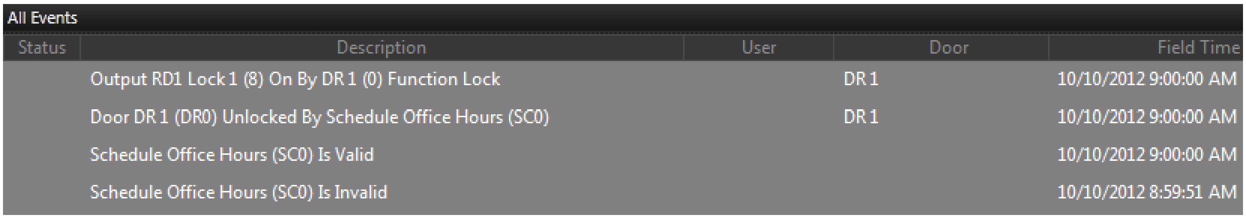


Set Date/Time

Date/Time: 10/10/2012 08:59 AM

Options

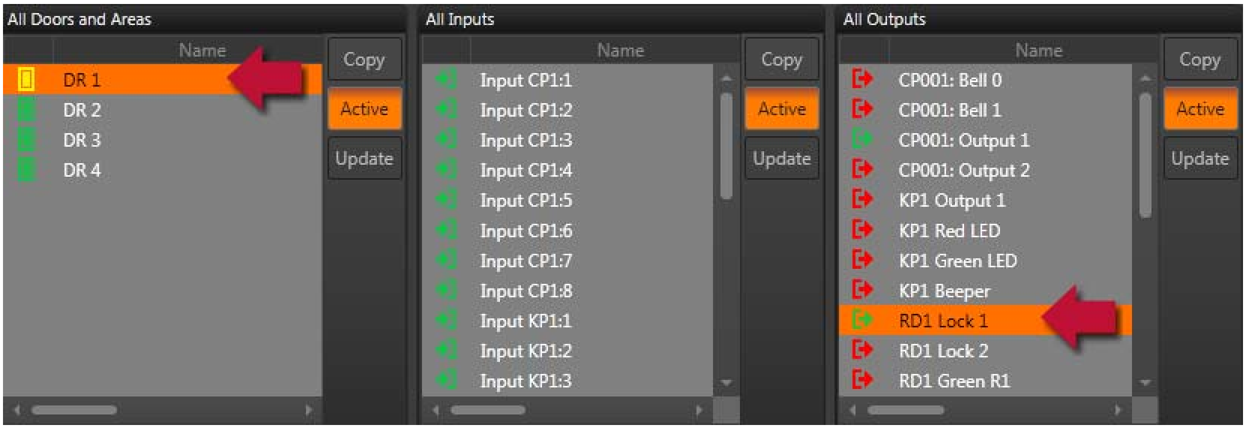
- Set the controller time to 08:59 on a weekday
- Looking at your event window, you should see the schedule go invalid, then after a minute it should go valid
- Straight after this, you should hear a relay click and see in the event window that the door has been unlocked



All Events

Status	Description	User	Door	Field Time
	Output RD1 Lock 1 (8) On By DR 1 (0) Function Lock		DR 1	10/10/2012 9:00:00 AM
	Door DR 1 (DR0) Unlocked By Schedule Office Hours (SC0)		DR 1	10/10/2012 9:00:00 AM
	Schedule Office Hours (SC0) Is Valid			10/10/2012 9:00:00 AM
	Schedule Office Hours (SC0) Is Invalid			10/10/2012 8:59:51 AM

- Looking at your status page now, you should see that DR 1 is now unlocked, and that the lock output is on.



All Doors and Areas

Name
DR 1
DR 2
DR 3
DR 4

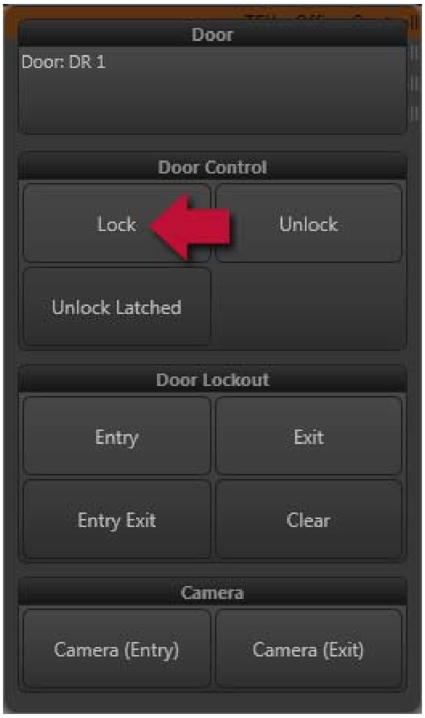
All Inputs

Name
Input CP1:1
Input CP1:2
Input CP1:3
Input CP1:4
Input CP1:5
Input CP1:6
Input CP1:7
Input CP1:8
Input KP1:1
Input KP1:2
Input KP1:3

All Outputs

Name
CP001: Bell 0
CP001: Bell 1
CP001: Output 1
CP001: Output 2
KP1 Output 1
KP1 Red LED
KP1 Green LED
KP1 Beeper
RD1 Lock 1
RD1 Lock 2
RD1 Green R1

Manually Locking a Door Unlocked by a Schedule

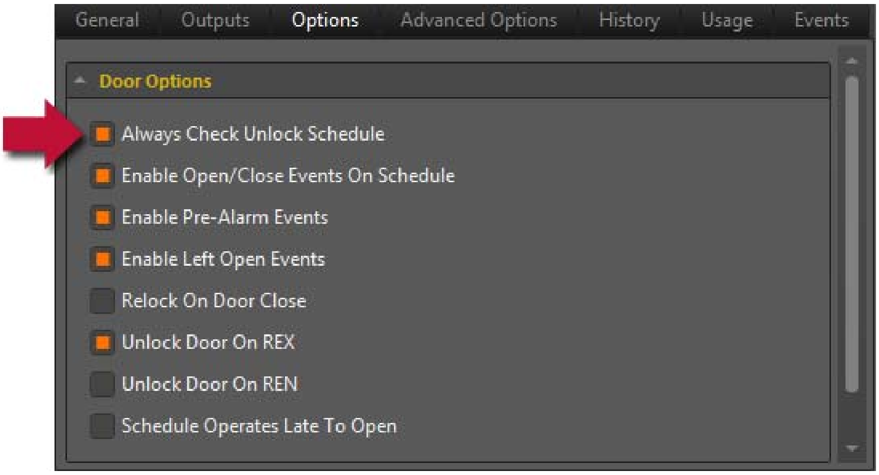


Door: DR 1

- Right click on DR 1 and select Lock
- Notice that the door locks and stays locked
- The schedule unlocked the door when it was edge triggered at 09:00am, but we still have full manual control and are able to override the door back to locked

Always Check Unlock Schedule

- Navigate to Programming | Doors and select DR 1.
- Click the Options tab and enable the option labeled Always Check Unlock Schedule.



Door Options

☑ Always Check Unlock Schedule
☑ Enable Open/Close Events On Schedule
☑ Enable Pre-Alarm Events
☑ Enable Left Open Events
☐ Relock On Door Close
☑ Unlock Door On REX
☐ Unlock Door On REN
☐ Schedule Operates Late To Open

- Save your changes and observe what happens.

  Once the download server sends the new configuration to the controller, the door unlocks again.
- Now try to manually lock the door again...

  You'll see that the controller almost immediately unlocks the door again.

  This is because we have told the controller to always check the schedule state.
- Clear (disable) the Always Check Unlock Schedule option and save the changes.

Schedule Triggering Summary

- Devices that are controlled by a schedule will be edge triggered by default
- Edge triggering allows full manual control of the devices in between times
- Edge triggering only gets processed at the start and end of a period
- If you program a device to follow a schedule, control will not take place until the next 'start' time passes
- If you configure the device to always follow the schedule, the device state will immediately start following the schedule
- When a device is configured to always follow the schedule, manual control of the device is no longer possible.

Holiday Groups

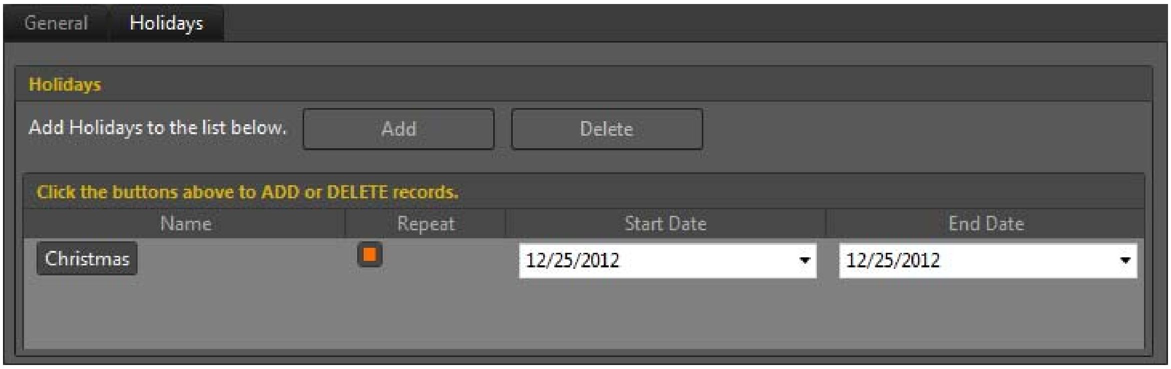
As schedules are commonly used to control access or secure areas, it is a common requirement for a schedule to behave differently on a holiday.

Holidays are defined in Protege GX using Holiday Groups.

You can create multiple groups, providing lots of flexibility in how holidays are applied to schedules.

Adding a Holiday Group

- Navigate to Sites | Holiday Groups and click Add
- Enter a name for the holiday group - we'll use National Holidays for our example
- Switch to the Holidays tab and click Add
- Enter the name Christmas and enable the Repeat option as Christmas occurs on the same day every year.
- Set the start and finish date to December 25th

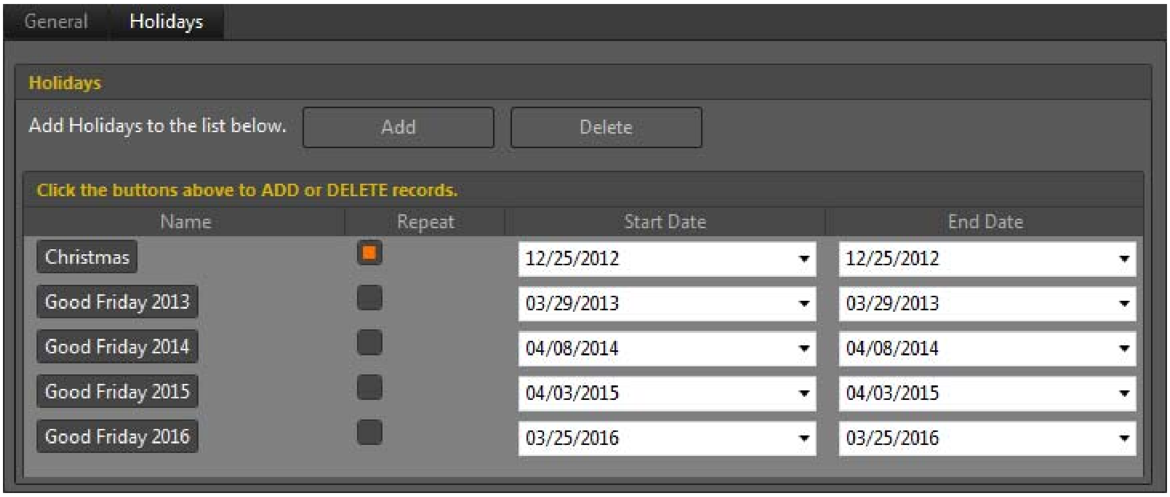

General
Holidays
Holidays
Add Holidays to the list below.
Add
Delete
Click the buttons above to ADD or DELETE records.

Name	Repeat	Start Date	End Date
Christmas	☑	12/25/2012	12/25/2012

Holidays That Change Dates Each Year

Let's look at a holiday that changes date every year. A good example of this is Easter.

These holidays need to be programmed for every occurrence, but being able to put multiple entries in a group means we can program many years in advance.



Holidays

Add Holidays to the list below.

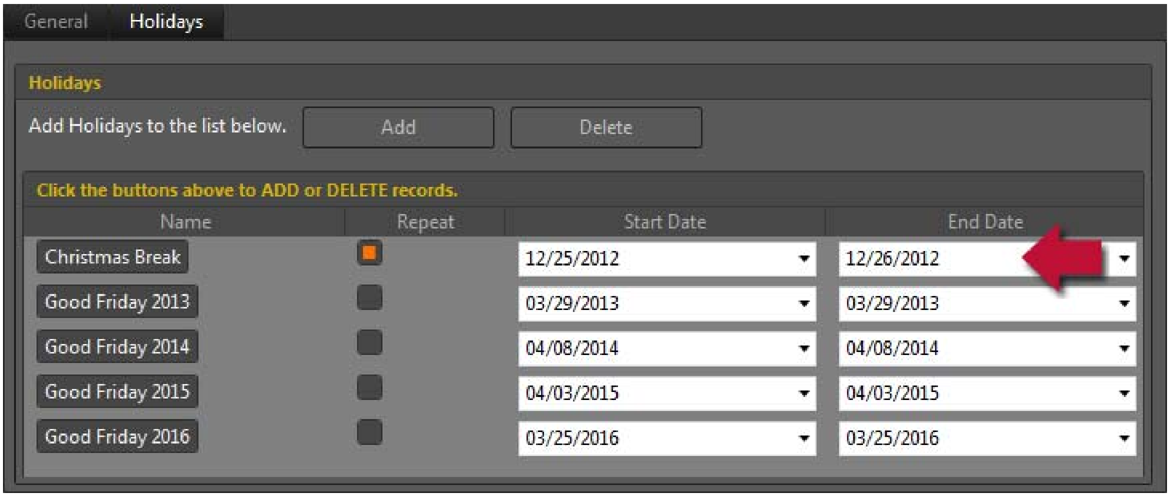
Click the buttons above to ADD or DELETE records.

Name	Repeat	Start Date	End Date
Christmas	☑	12/25/2012	12/25/2012
Good Friday 2013	□	03/29/2013	03/29/2013
Good Friday 2014	□	04/08/2014	04/08/2014
Good Friday 2015	□	04/03/2015	04/03/2015
Good Friday 2016	□	03/25/2016	03/25/2016

Holidays That Span Multiple Days

Holidays can also span multiple days. For instance, Christmas Day and Boxing Day usually go hand in hand, so this can be configured as a single holiday.

Just set the **start date** (the first day that will be classed as a holiday), and the **end date** (the last day that will be classed as a holiday).



Holidays

Add Holidays to the list below.

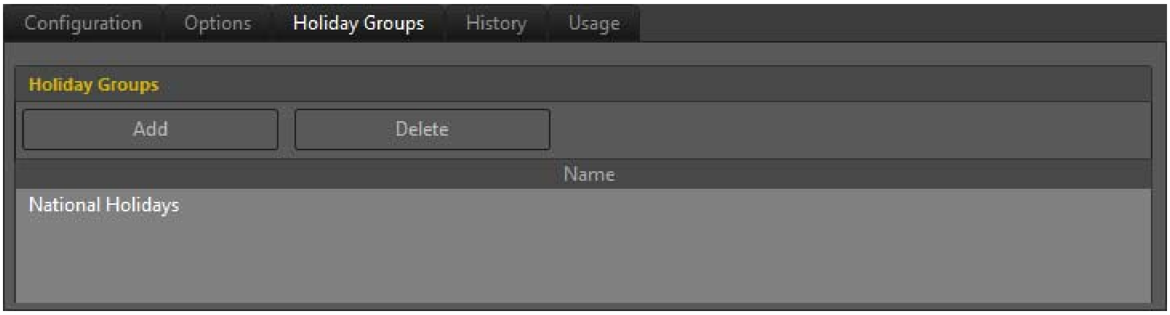
Click the buttons above to ADD or DELETE records.

Name	Repeat	Start Date	End Date
Christmas Break	☑	12/25/2012	12/26/2012
Good Friday 2013	□	03/29/2013	03/29/2013
Good Friday 2014	□	04/08/2014	04/08/2014
Good Friday 2015	□	04/03/2015	04/03/2015
Good Friday 2016	□	03/25/2016	03/25/2016

Applying a Holiday Group to a Schedule

Once you have programmed a holiday group or groups, these can be applied to your schedules.

- Navigate to Sites | Schedules
- Select the Holiday Groups tab and click Add
- Select the group or groups of holidays that you wish to apply to this schedule.



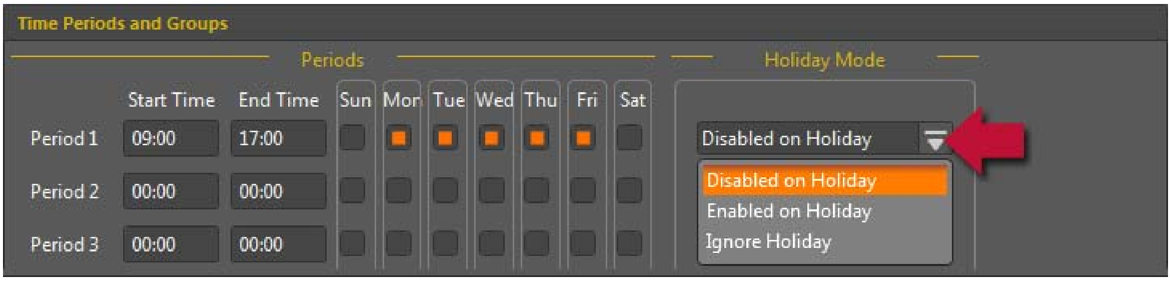
National Holidays

This tells the schedule which days are holidays, but it does not tell the schedule what to do if it is a holiday. For that, you must configure a Holiday Mode.

Schedules and Holiday Mode

Each period in a schedule can be assigned a different Holiday Mode. The three modes to select from:

- Disabled on Holiday: When selected, the period will not make the schedule valid on a holiday. In other words, if a door is programmed to unlock by this schedule, it will not unlock on a holiday if Disabled on Holiday is selected. This is the default mode of operation for schedules.
- Enabled on Holiday: When selected, the period will only ever make the schedule valid on a holiday.
- Ignore Holiday: When selected, the period will make the schedule valid regardless of whether the day is a holiday or not.



	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	09:00	17:00	□	☑	☑	☑	☑	☑	□	Disabled on Holiday
Period 2	00:00	00:00	□	□	□	□	□	□	□	
Period 3	00:00	00:00	□	□	□	□	□	□	□	

Default Operation

If you program times and days in to a schedule, but don't do anything else, then the schedule will always operate.

For a holiday to stop a schedule from becoming valid, the following must have been programmed:

1. The holiday must be programmed in a holiday group
2. That holiday group must be applied to the schedule
3. The holiday mode must be programmed as Disabled on Holiday

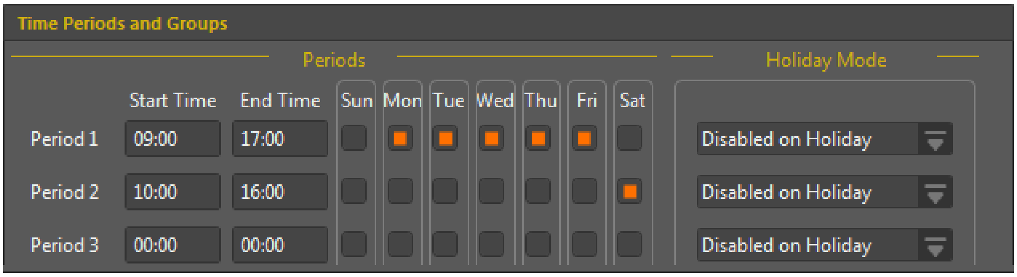
Multiple Time Spans

Schedules sometimes need to turn on and off more than once, or at different times on different days. Protege GX has 8 periods for each schedule to allow for these scenarios.

Different Hours for Weekends

Sometimes, premises will need to open for shorter hours on a weekend.

To set this up, we simply add the second period of shorter hours and select the relevant day (in our example Saturday):



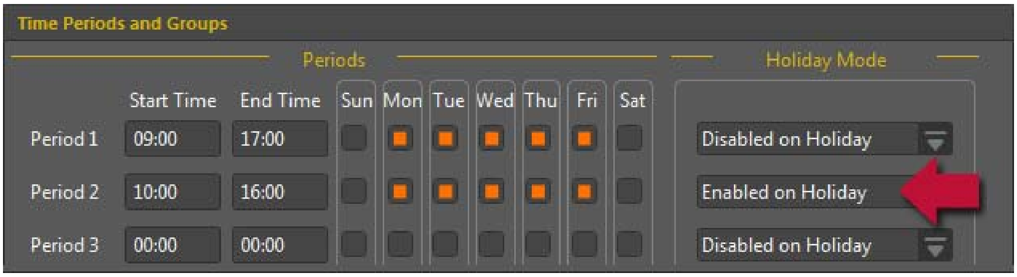
Time Periods and Groups

Periods — Holiday Mode

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Period 1	09:00	17:00	□	☑	☑	☑	☑	☑	□	Disabled on Holiday
Period 2	10:00	16:00	□	□	□	□	□	□	☑	Disabled on Holiday
Period 3	00:00	00:00	□	□	□	□	□	□	□	Disabled on Holiday

Shorter Hours on a Holiday

In some installations, especially retail, a schedule must still operate on a holiday, but may do so for shorter hours:



Time Periods and Groups

Periods — Holiday Mode

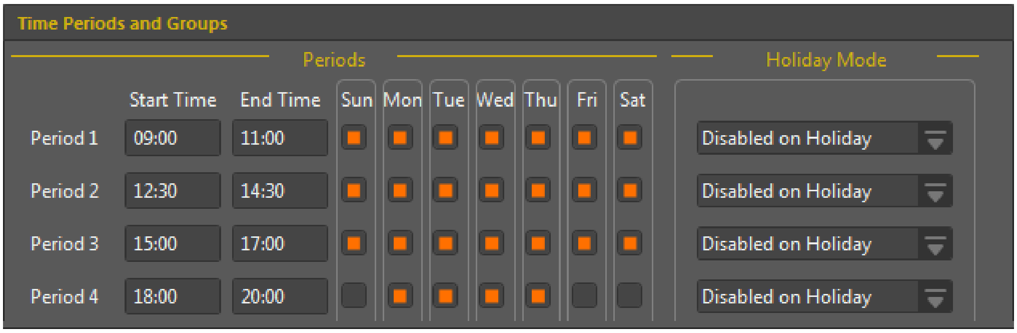
	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Period 1	09:00	17:00	□	☑	☑	☑	☑	☑	□	Disabled on Holiday
Period 2	10:00	16:00	□	☑	☑	☑	☑	☑	□	Enabled on Holiday
Period 3	00:00	00:00	□	□	□	□	□	□	□	Disabled on Holiday

In this example, the schedule will be valid from 9am to 5pm, Monday to Friday on normal days. If the day is a holiday, the schedule will only be valid from 10am to 4pm.

Multiple Periods in a Single Day

Another example would be where there are multiple periods required in a single day.

Consider a movie theatre where there are multiple session times and the doors are to be unlocked during these times.



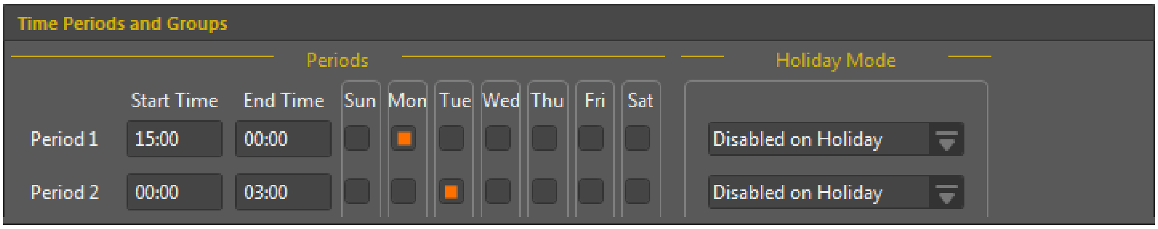
Time Periods and Groups

Periods — Holiday Mode

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Period 1	09:00	11:00	☑	☑	☑	☑	☑	☑	☑	Disabled on Holiday
Period 2	12:30	14:30	☑	☑	☑	☑	☑	☑	☑	Disabled on Holiday
Period 3	15:00	17:00	☑	☑	☑	☑	☑	☑	☑	Disabled on Holiday
Period 4	18:00	20:00	□	☑	☑	☑	☑	□	□	Disabled on Holiday

Overnight Schedules

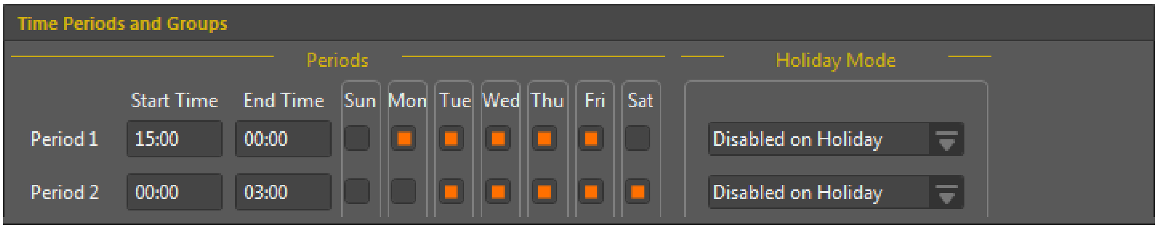
Where a schedule is required to operate overnight, enter a start time, but leave the end time as 00:00. This results in the period being valid from 3pm until midnight:



Time Periods and Groups

Periods	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	15:00	00:00	□	☑	□	□	□	□	□	Disabled on Holiday
Period 2	00:00	03:00	□	□	☑	□	□	□	□	Disabled on Holiday

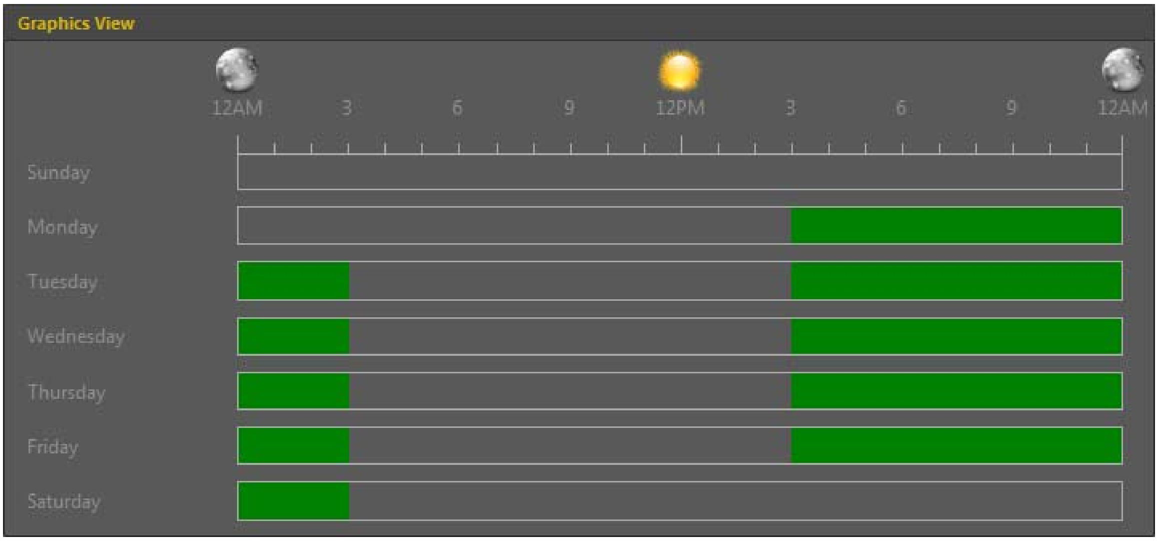
Now program a second period to start at midnight and continue until 3am. The schedule will become valid at 3pm on Monday, and stay valid until 3am the following morning. By extending the days the period is valid, we can create an overnight Monday to Friday shift:



Time Periods and Groups

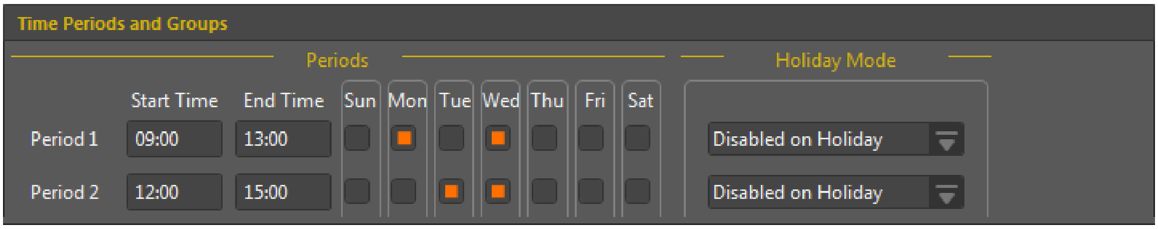
Periods	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	15:00	00:00	□	☑	☑	☑	☑	☑	□	Disabled on Holiday
Period 2	00:00	03:00	□	□	☑	☑	☑	☑	☑	Disabled on Holiday

This schedule will now be valid from 3pm to 3am Monday to Friday:



Overlapping Periods

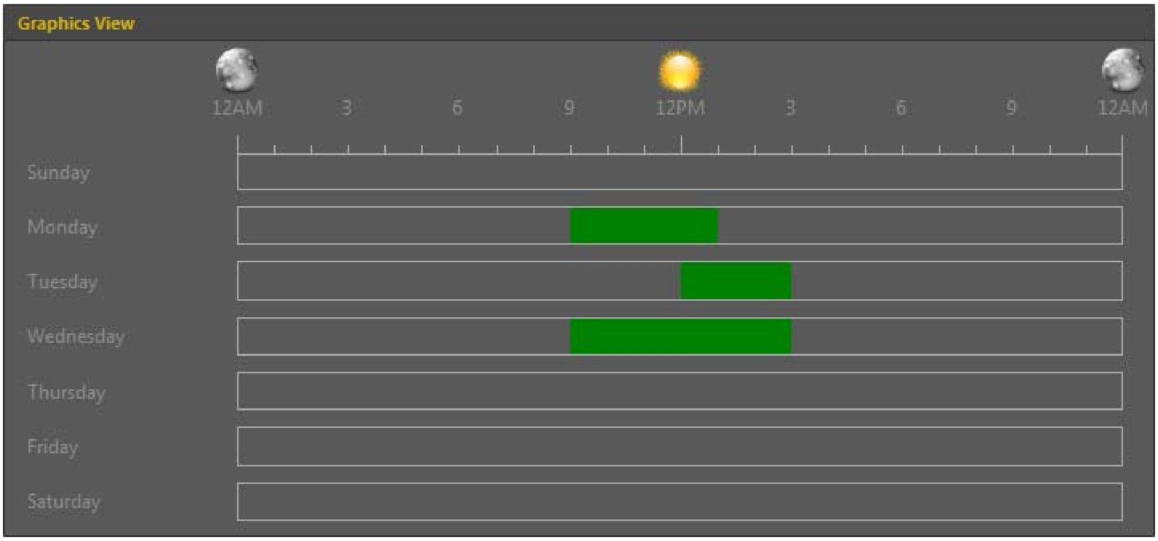
Where overlapping periods are present, the schedule will take the sum of all periods



Time Periods and Groups

Periods	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	09:00	13:00	□	☑	□	☑	□	□	□	Disabled on Holiday
Period 2	12:00	15:00	□	□	☑	☑	□	□	□	Disabled on Holiday

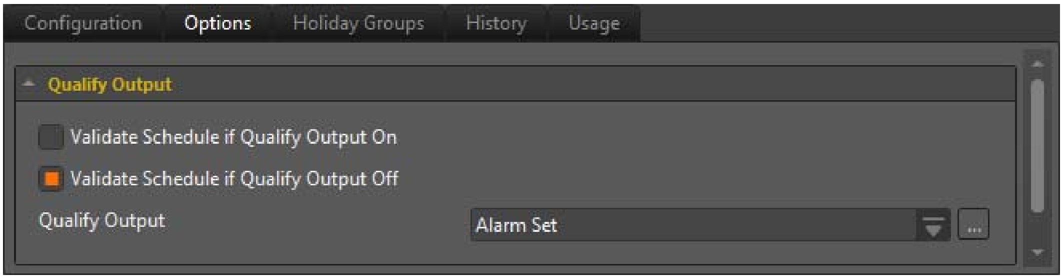
In this example, Wednesday has two periods that overlap. The two periods are combined, and as a result, the schedule will be valid from 9am to 3pm on Wednesday.



Because they have been combined, the edges are at 9am and 3pm, and these are the only times that the schedule will change state.

Qualify Output

The final bit of schedule flexibility comes from the ability to qualify a schedule with the state of an output.



Qualify Output

□ Validate Schedule if Qualify Output On

☑ Validate Schedule if Qualify Output Off

Qualify Output: Alarm Set

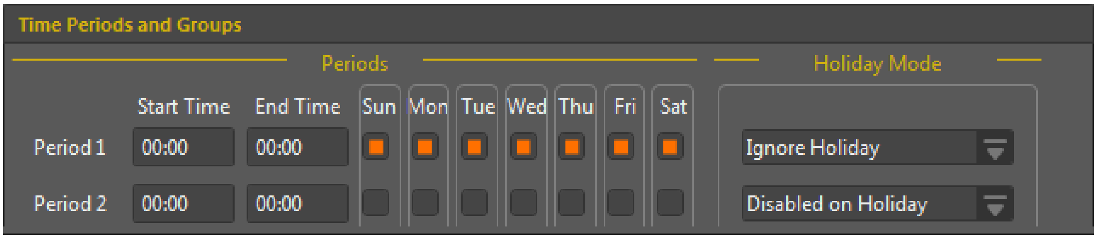
In this example, this schedule will only ever become valid if all the other conditions of the schedule are met, and the Alarm Set output is off.

Consider a schedule that has been programmed to unlock the front door of a retail shop. By configuring the above, the front door would unlock at opening time only if the alarm has been unset. If nobody shows up for work, the door doesn't unlock.

Adding the Managers Schedule

Referring back to our system design, we require some additional schedules. The manager is going to require access to the building 24/7.

- Add a new schedule called Managers Hours
- Check every day in Period 1 and set the holiday mode to Ignore Holiday



Time Periods and Groups

	Periods									Holiday Mode
	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Period 1	00:00	00:00	☑	☑	☑	☑	☑	☑	☑	Ignore Holiday
Period 2	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday

This schedule is effectively the same as the built in schedule called Always, but we now have an easy way to reconfigure the managers access at a later date if requirements change.

Adding the Warehouse Schedules

The Warehouse requires two schedules to cover the two shifts:

- Add a new schedule called Warehouse Shift 1
- Set the schedule up to be valid from 06:00 to 14:00 Monday through Friday and disabled on holidays
- Add another schedule called Warehouse Shift 2
- Set the schedule up to be valid from 10:00 to 18:00 Monday through Friday and disabled on holidays

Review Questions

What are Access Levels used for?

□ To control which elevator levels they have access to

□ To control what users can do, where they can go and when they can do these things

□ To control how a door responds to a user

□ To provide a way to rank users

In an Access Level, what are Door Groups used for?

□ They define which doors a user has access to

□ They allow a number of doors to be unlocked with a single card read

□ They are used for scheduling multiple doors to unlock

□ They define which Area a door belongs to

What happens if the Import Users Wizard has an Access Level mapped that doesn't exist in the Protege GX database?

□ The wizard will crash

□ The wizard will skip the user

□ The wizard will import the user but leave the Access Level unset

□ The wizard will import the user and create a new Access Level to match

What must you do to ensure a schedule does not operate on a holiday?

□ Nothing. By default, the schedule will not operate on a holiday.

□ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Disabled on Holiday'.

□ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Enabled on Holiday'.

□ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Ignore Holiday'.

How do you program a schedule to run from 11pm on Monday through to 2am on Tuesday?

- □ Program period 1 from 23:00 to 00:00 and check Monday. Program period 2 from 00:00 to 02:00 and check Monday and Tuesday.
- □ Program period 1 from 23:00 to 23:59 and check Monday. Program period 2 from 00:01 to 02:00 and check Tuesday.
- □ Program period 1 from 23:00 to 00:00 and check Monday. Program period 2 from 00:00 to 02:00 and check Tuesday.
- □ Program period 1 from 23:00 to 23:59 and check Monday. Program period 2 from 00:01 to 02:00 and check Monday and Tuesday.

How do you program a schedule to be valid from 09:00 to 17:00 Monday to Friday if the day is not a holiday?

- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Disabled on Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Enabled on Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Ignore Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Program a qualify output for holidays.

How do you program a schedule to be valid from 09:00 to 17:00 on normal days and 10:00 to 16:00 on holidays?

- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Enabled on Holiday' and the 10:00-16:00 period to 'Disabled on Holiday'.
- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Ignore Holiday' and the 10:00-16:00 period to 'Enabled on Holiday'.
- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Ignore Holiday' and the 10:00-16:00 period to 'Disabled on Holiday'.
- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Disabled on Holiday' and the 10:00-16:00 period to 'Enabled on Holiday'.

Module 133: Basic Intruder Detection

There are several items that need to be configured to set up a system for intruder detection:

- Areas: A location - often with a group of devices - that will be monitored for intrusion or other purposes.
- Inputs: Used to connect motion detectors, door contacts, and other protection devices to the system.
- Outputs: Used to control devices from the Protege system, outputs can be used to activate sirens, bells, warning devices, control lighting, and doors.

This module outlines how to program areas and inputs to provide effective intruder detection.

In This Module

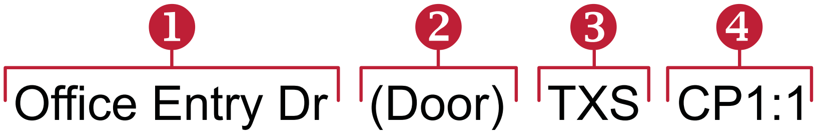
Programming Areas

Naming Conventions

Before you start programming the system, it's important that you decide on the naming conventions that will be used. This step is too commonly forgotten, resulting in systems that are inconsistent and therefore hard to understand and maintain.

- Consider that the **first 16 characters** are what a user sees from a keypad, so these characters should be as descriptive as possible to ensure items are easily identifiable.
- Additional information can help us later when we want to **search** for similar devices (for example all PIRs or all doors, etc) to quickly configure common properties.

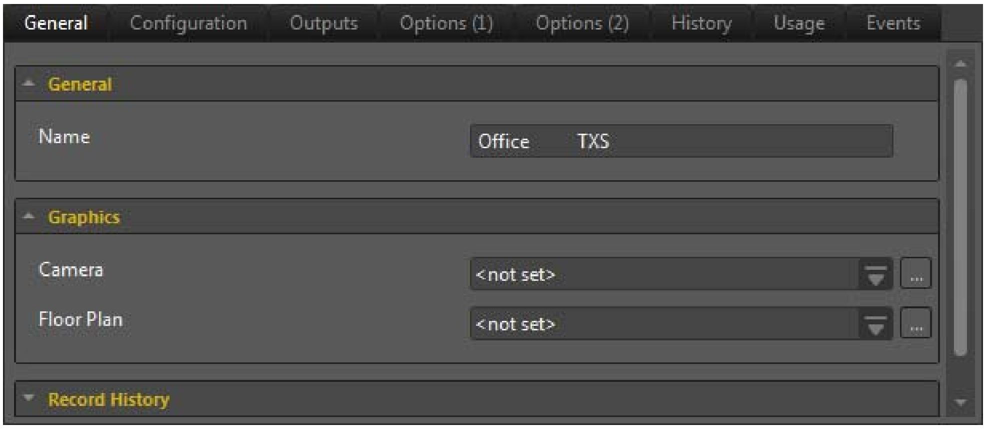
Based on this, we are going to adopt the following naming convention for our ACME site:



1. The first 16 characters will describe the item - Office Area DR, Managers Door, etc. We'll add spaces where necessary before adding the additional information so the keypad only shows our description
2. We'll then include the connected device type in brackets - such as (PIR) and (REX) etc - so we can find and grab the same type of devices to quickly configure the common properties
3. We'll follow this with **TXS** as a site reference so we can easily identify items belonging to the Texas office
4. Finally, we'll use the hardware address to identify where the device physically connects to the Protege system

Programming the Office Area

1. Navigate to **Programming | Areas** and click **Add**
2. Using our naming convention, we'll name the Area **Office   TXS**



Name: Office   TXS

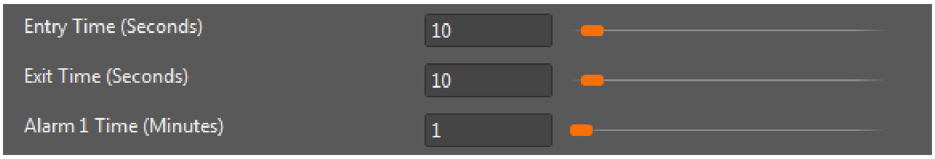
Camera: <not set>

Floor Plan: <not set>

We've added 10 spaces to ensure our description uses the full 16 characters and so the site identifier does not appear at a keypad. And because an Area is not physically connected, there is no device type or hardware address to include.

3. Select the Configuration tab:

   - Set the Entry Time to 10 seconds. This will allow any users that enter the area 10 seconds to disarm it before the area generates an alarm
   - Set the Exit Time to 10 seconds. This will allow our users 10 seconds to exit the area once the arming of the area has begun before an alarm is triggered
   - Set the Alarm 1 Time to 1 minute. This determines how long the bell/siren output for the area will remain activated before timing out.



Entry Time (Seconds) 10

Exit Time (Seconds) 10

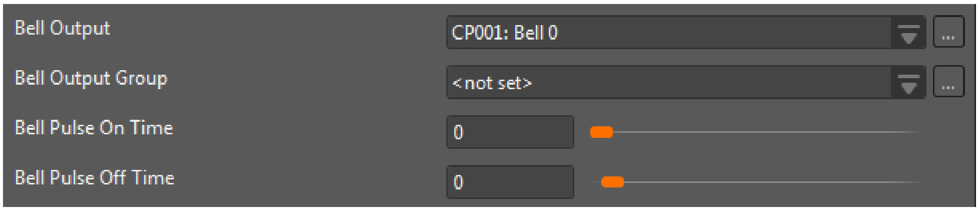
Alarm 1 Time (Minutes) 1

Normally we would use longer Entry and Exit times, but we will keep these short for our training system.

4. Select the Outputs tab:

   - Set the Bell Output to CP001: Bell 0

   This determines the output that will be triggered when the area alarm is activated. In most cases, this will be used to connect a siren.



Bell Output CP001: Bell 0

Bell Output Group <not set>

Bell Pulse On Time 0

Bell Pulse Off Time 0

The Exit Delay and Entry Delay Outputs are activated whenever the area starts the exit or entry delay cycle. Using an audible output like the keypad beeper provides a distinctive warning to users to let them know the area has begun arming and they need to get out, or that the entry delay period has been triggered and they need to disarm the area before it generates an alarm.

   - Set the Exit Delay Output to KP1 Beeper
   - Set the Exit Delay Pulse On Time to 1
   - Set the Exit Delay Pulse Off Time to 9
   - Set the Entry Delay Output to KP1 Beeper

The Disarmed and Armed Outputs are activated whenever the area completes the disarming or the arming cycle. Using an output such as a keypad LED provides a visual indication of the status of an area.

   - Set the Disarmed Output to KP1 Green LED

   ✓ The Disarmed Indicator on the keypad will be green when the area is disarmed

   - Set the Armed Output to KP1 Red LED

   🔒 The Armed Indicator on the keypad will be red when the area is armed

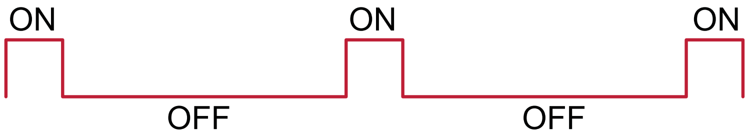
5. Click Save to finish configuring the Area

Pulse Times

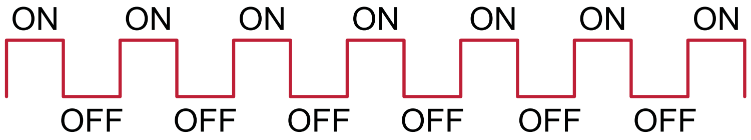
Pulse times allow an output or group of outputs to be pulsed for the duration of an area state. For example, the keypad beeper can be used to make short beeps for an exit delay, then a long continuous beep for entry delay.

Pulse times are measured in tenths of a second or 100ms. A pulse time of 10 equates to 1 second.

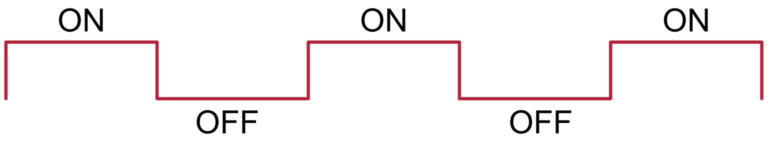
Setting the **Pulse On** to **1** and the **Pulse Off** to **9** provides a short pulse (such as a short beep or flash) every second.



Setting both the Pulse On and Pulse Off values to **1** will provide a rapid pulse on/pulse off:



Setting both values to **5** provides a slow steady pulse on/pulse off:

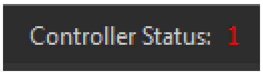


If the Pulse On and Pulse off values are both set to zero (the default setting) the pulse is disabled and the output will **remain on** for the duration of the cycle time.

If Pulse On is given a value but Pulse Off is set to zero, the output will pulse (flash or beep) **once only** then remain off.

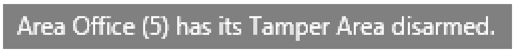
Health Status

Once the configuration has been downloaded, you'll notice a health status count showing on the status bar.



Controller Status: 1

Navigate to **Sites | Controllers** and pull up the Health Status window.



Area Office (5) has its Tamper Area disarmed.

You should see a message similar to the one above.

Remember, the number in brackets is a reference to the server database ID - this may be different on your server.

24 Hour Tamper Area

Every Area in Protege is actually made up of two areas.

- The main area that monitors devices (such as PIRs) only when it is armed
- The 24 hour (or Tamper) area that monitors for a tamper or short condition on devices (such as PIRs) 24/7

Whenever a 24 hour area is disarmed, it will be displayed under the controller's Health Status.

The 24 hour tamper area is armed automatically when the main area is armed.

Testing the Office Area

Test the Area now by logging in with the Installer code of 000000, then pressing [Enter].

You should get a user greeting, then a display of the Office area status.

```
Office
is DISARMED
```

Note that the green disarmed LED has not turned on yet. This is because the Area Disarmed function is edge triggered and hasn't been activated yet. The next time that the Area Disarmed function is triggered, the Keypad Green LED will be turned on.

Arming the Office Area

Press the [Arm] key.

Once testing is complete, the Area should go into exit delay.

The exit delay function will now be triggered and any output(s) associated with it will be turned on or pulsed.

In our case, the keypad beeper should start making short beeps.

Note: Whenever a key is pressed on the keypad, the system grabs control of the beeper output so that a key press results in a beep. This will take priority over anything else trying to turn the beeper output on. After approximately 5 seconds the system will release control of the beeper output and anything trying to turn it on will then be allowed control.

Disarming the Office Area

Once arming has finished, the exit delay function will stop, turning off any output(s) associated with it.

The display on the keypad will change and the red Armed LED should light up.

```
Office
is ARMED
```

The Controller Health Status should also return to OK. This is because the 24hr portion of the Office Area is now armed.

Note that the user remains logged in. This is because we are using the Installer menu group which allows the user to stay logged in permanently.

- Press the [Disarm] key and observe the red LED turn off and the green LED turn on.
- Press [X] to log out.

Disarming the 24 Hour Area

The 24 hour or tamper portion of an area can be armed and disarmed at the keypad by any user that has an appropriate menu group.

Log in using the Installer code of 000000.

Once the area status is displayed, press the left arrow key.

```
Office
24HR Enabled
```

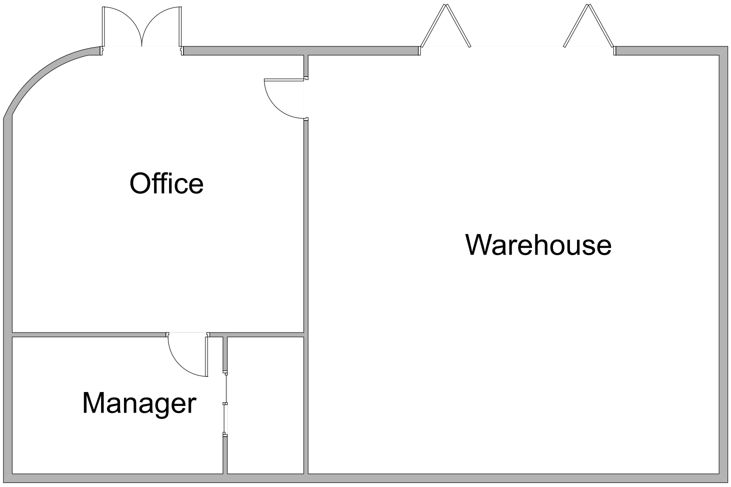
You can now use the [Arm] and [Disarm] keys to control just the 24 hour portion of the area.

Programming Additional Areas

Based on ACME's requirements, we need to create additional areas as follows:

- Warehouse
- Managers Office

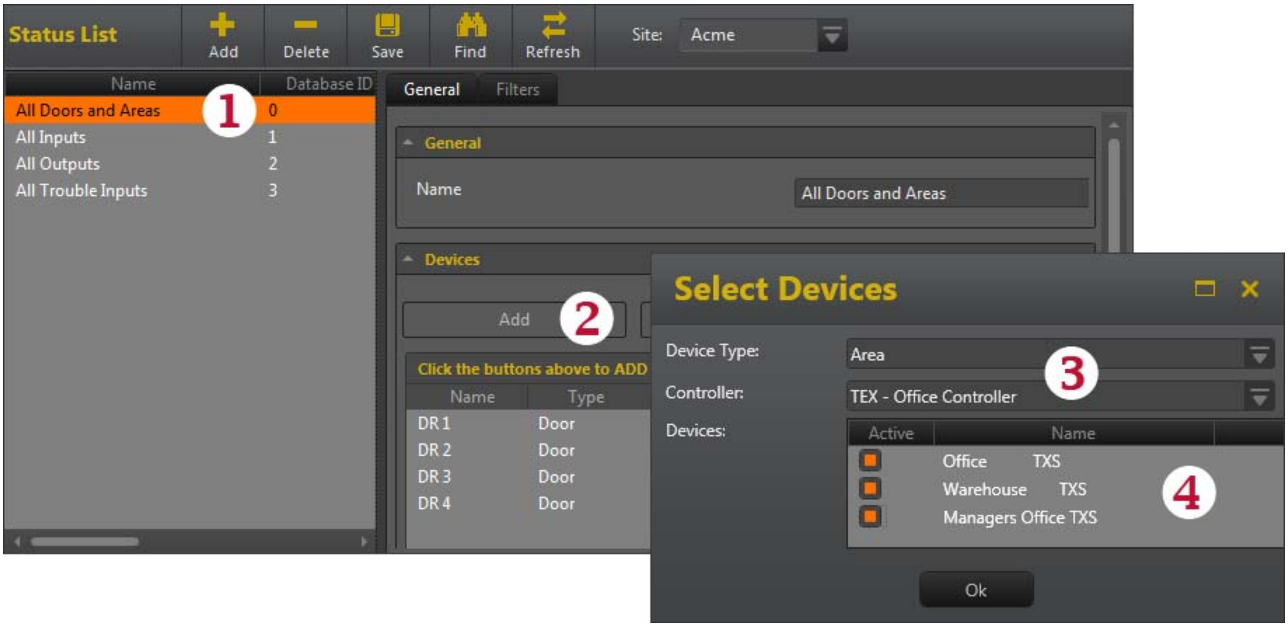
Configure the **Timings** and **Bell Output** the same as the Office area, but leave the exit/entry delay and disarmed/armed outputs at the default values (not set). These areas don't have a keypad, so these settings are not required.



Don't forget to use our consistent naming convention.

Updating the Technician Status Page

Now we need to add the new areas to our Technician status page. Navigate to Monitoring | Setup | Status Lists.



Name	Database ID
All Doors and Areas	0
All Inputs	1
All Outputs	2
All Trouble Inputs	3

General

Name: All Doors and Areas

Devices

Add

Click the buttons above to ADD

Name	Type
DR 1	Door
DR 2	Door
DR 3	Door
DR 4	Door

Device Type: Area

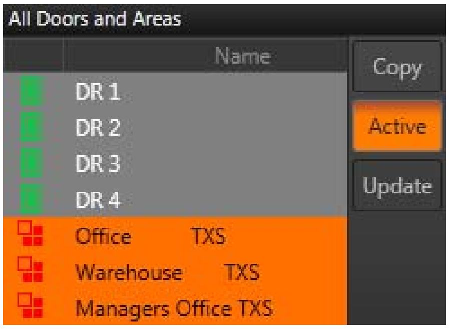
Controller: TEX - Office Controller

Devices:

Active	Name
■	Office TXS
■	Warehouse TXS
■	Managers Office TXS

1. Select the All Doors and Areas Status List
2. Click Add to open the Select Devices window
3. Set the Device Type to Area and choose your Controller
4. Check the new Areas and click OK.

If your status page is already open, you will need to close it and open it again for the changes to take place. You should now have three areas in your status list.



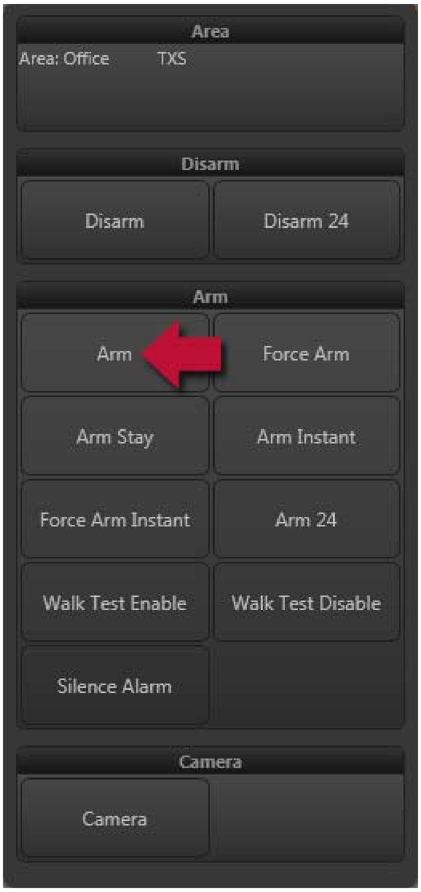
All Doors and Areas

	Name
🟩	DR 1
🟩	DR 2
🟩	DR 3
🟩	DR 4
🟥	Office TXS
🟥	Warehouse TXS
🟥	Managers Office TXS

Controlling Areas from the Software

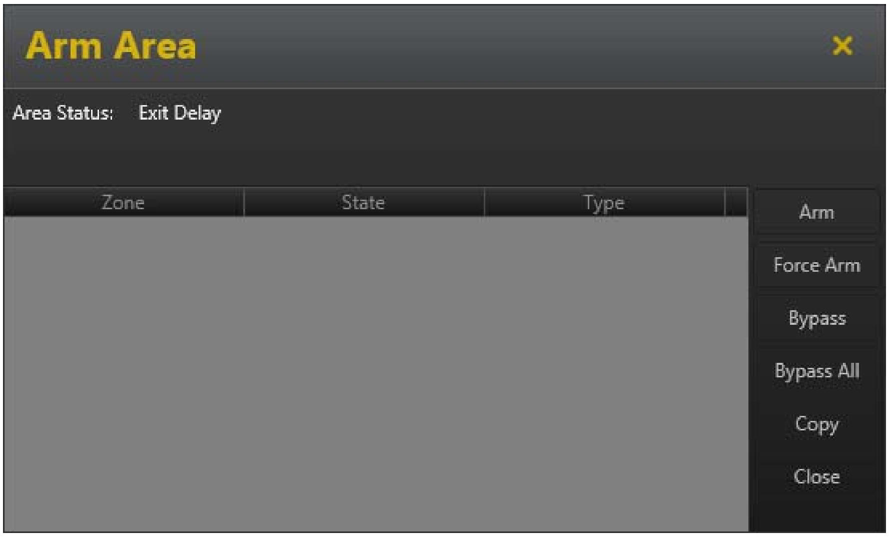
Devices shown in status lists can be controlled directly from the software:

- Right clicking the Office area will present a control menu.



- Try clicking the Arm option.

  You will be presented with an Arm Area control window:



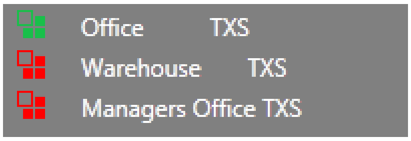
Arm Area

Area Status: Exit Delay

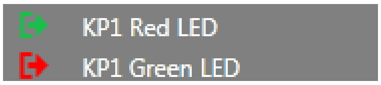
The area status should change to Exit Delay then you should hear the keypad beeper pulsing.

- Once armed, close the window.

  Note that the statuses are updated live on the status page.



Office TXS
Warehouse TXS
Managers Office TXS



KP1 Red LED
KP1 Green LED

  The Office area is now shown as armed, and the output states have changed to match the keypad.

- Navigate to **Programming | Areas** and right click on the **Office** Area.

  You'll see that the control menu is accessible from here too.

  Right clicking most devices within the Protege GX interface will provide some level of control or functionality.

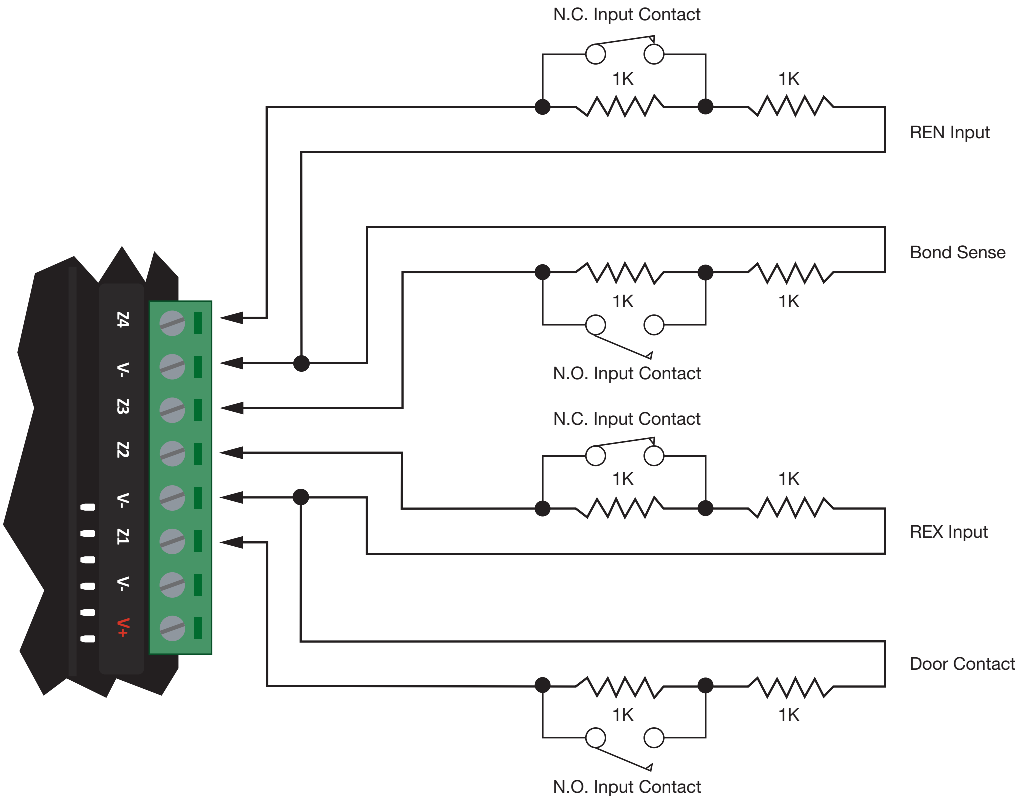
- **Disarm** the **Office** area again.

Programming Inputs

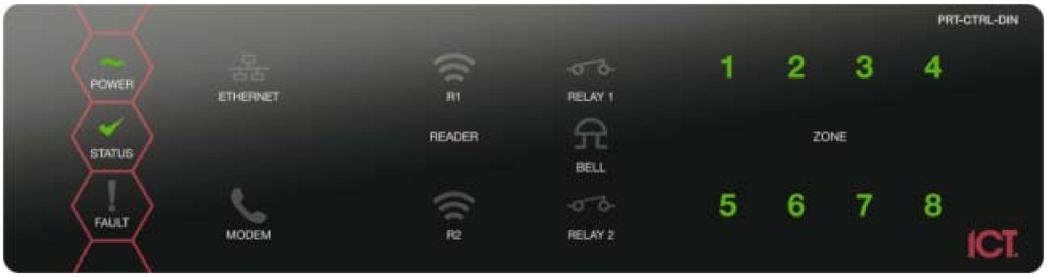
Input Testing

Next, we will need to program some **Inputs** into the areas. So that we can test the functionality, wire buttons or switches as follows:

- On the Controller, wire inputs 1 - 8
- On the RMD2, wire inputs 1, 2, 5 and 7

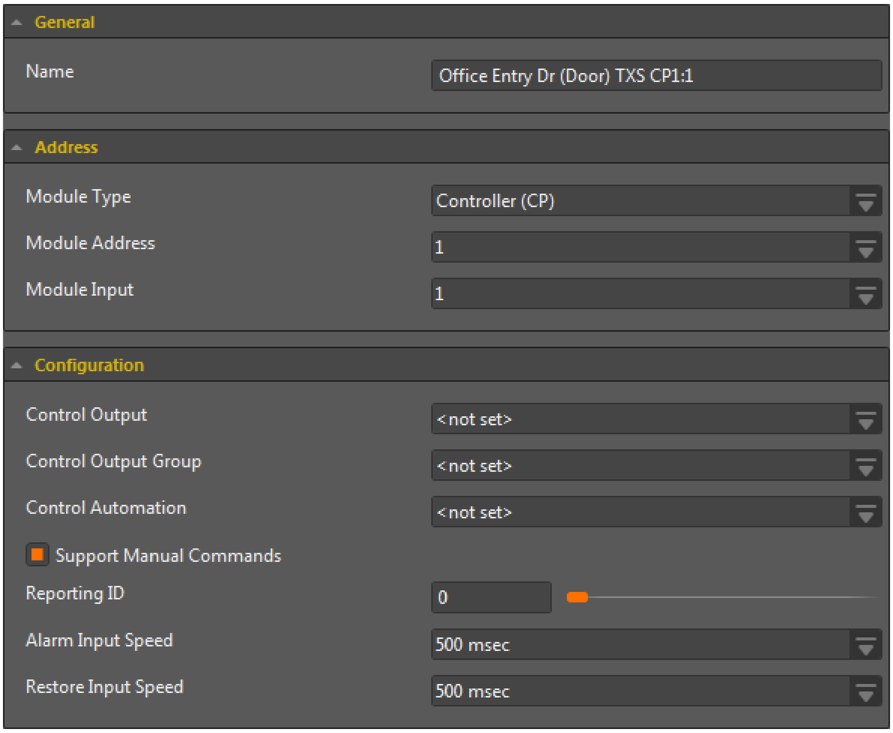


You should have green LED's now for each of the inputs you have wired switches to:



Programming Inputs

1. Navigate to **Programming | Inputs**
2. Select **Input CP1:1** from the Record List
3. Using our naming convention, set the **Name** to **Office Entry Dr (Door) TXS CP1:1**



General

Name: Office Entry Dr (Door) TXS CP1:1

Address

Module Type: Controller (CP)

Module Address: 1

Module Input: 1

Configuration

Control Output: <not set>

Control Output Group: <not set>

Control Automation: <not set>

☑ Support Manual Commands

Reporting ID: 0

Alarm Input Speed: 500 msec

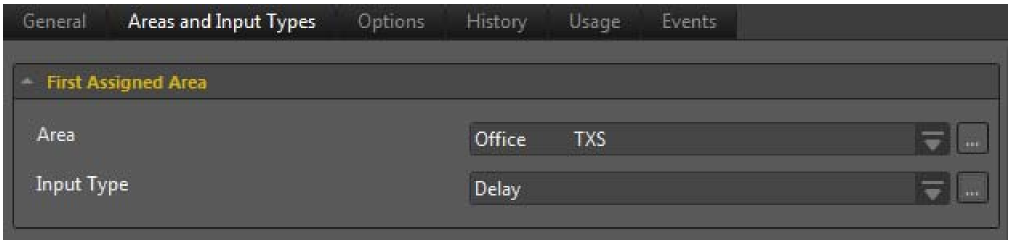
Restore Input Speed: 500 msec

We'll leave the rest of the settings on the General tab as they are:

- The **Module Address** identifies where the device physically connects to the system and allows us to shift inputs around at a later date if we need to.
- The **Reporting ID** (if defined) will override the report map for Contact ID and offsite monitoring. If left at 0, it will follow the default report map. Only change this value if you want to give the input a specific number.
- The **Alarm Input Speed** determines how long an input must be open for before an alarm event will be generated.
- The **Restore Input Speed** determines how long an input must be closed for before a restore event will be generated.

4. Select the **Areas and Input Types** tab

- Set the **Area** to the **Office TXS** area
- Set the **Input Type** to **Delay**



First Assigned Area

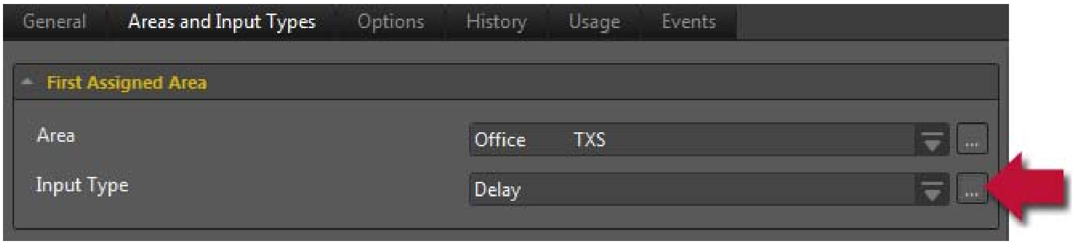
Area: Office TXS

Input Type: Delay

Inputs can be assigned to as many as four areas and they can perform a different function in each area independently of the other area's status. For now, we'll just use the first area.

Input Types

Input Types define **how** an input will operate in an area. For example, Delay will go into entry delay when triggered, whereas Instant will activate immediately.



General | Areas and Input Types | Options | History | Usage | Events

First Assigned Area

Area: Office TXS

Input Type: Delay

There are a range of predefined input types included by default. These can be modified to suit your requirements or new input types created. The four most commonly used input types are:

- **Instant:** Activates an armed area immediately when input opens
- **Delay:** Activates entry delay when input opens
- **Trouble Silent:** Used for system trouble inputs. Generates an alarm without the Bell
- **24 Hour Alarm:** Used for panic inputs. Generates an alarm even when area is disarmed

Programming Additional Inputs

Based on Acme's requirements, program the **names** of the additional inputs as follows:

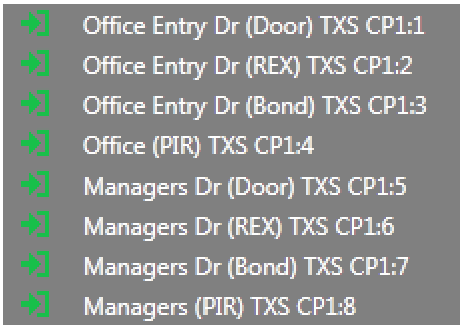
Input	Description
CP1:1	Office Entry Dr (Door) TXS
CP1:2	Office Entry Dr (REX) TXS
CP1:3	Office Entry Dr (Bond) TXS
CP1:4	Office (PIR) TXS
CP1:5	Managers Dr (Door) TXS
CP1:6	Managers Dr (REX) TXS
CP1:7	Managers Dr (Bond) TXS
CP1:8	Managers (PIR) TXS

Input	Description
RD2:1	Warehouse Roller Door (Reed) TXS
RD2:2	Warehouse (PIR) TXS
RD2:3	Spare TXS
RD2:4	Spare TXS
RD2:5	Office to Warehouse Door (Door) TXS
RD2:6	Spare TXS
RD2:7	Office to Warehouse Door (Bond) TXS
RD2:8	Spare TXS

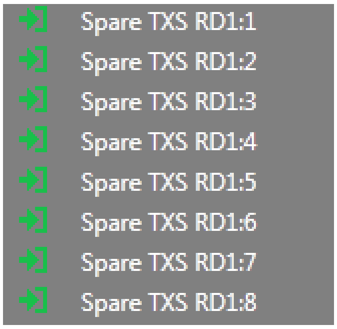
- Remember to use our consistent naming convention - for example CP1:2 will be Office Entry Dr (REX) TXS CP1:2
- Label all unused inputs as Spare. For easy searching later, use the site name and input address too - for example Spare TXS RD2:3

Onboard Reader Expander

If you look at the Technician status page, you will note that we have inputs 1-8 for the Controller and for Reader Expander 1.



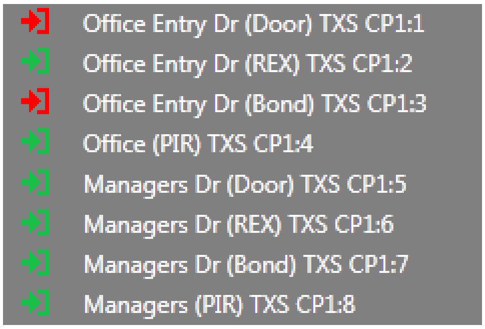
🟩 Office Entry Dr (Door) TXS CP1:1
🟩 Office Entry Dr (REX) TXS CP1:2
🟩 Office Entry Dr (Bond) TXS CP1:3
🟩 Office (PIR) TXS CP1:4
🟩 Managers Dr (Door) TXS CP1:5
🟩 Managers Dr (REX) TXS CP1:6
🟩 Managers Dr (Bond) TXS CP1:7
🟩 Managers (PIR) TXS CP1:8



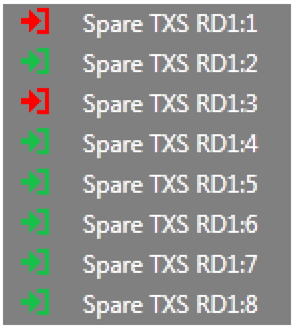
🟩 Spare TXS RD1:1
🟩 Spare TXS RD1:2
🟩 Spare TXS RD1:3
🟩 Spare TXS RD1:4
🟩 Spare TXS RD1:5
🟩 Spare TXS RD1:6
🟩 Spare TXS RD1:7
🟩 Spare TXS RD1:8

The Controller has been configured to register as Reader Expander 1, so what happens to the inputs assigned to Reader Expander 1?

If you now open Inputs 1 and 3 on the Controller, you will see that both the Controller and Reader Expander inputs change state.



🟥 Office Entry Dr (Door) TXS CP1:1
🟩 Office Entry Dr (REX) TXS CP1:2
🟥 Office Entry Dr (Bond) TXS CP1:3
🟩 Office (PIR) TXS CP1:4
🟩 Managers Dr (Door) TXS CP1:5
🟩 Managers Dr (REX) TXS CP1:6
🟩 Managers Dr (Bond) TXS CP1:7
🟩 Managers (PIR) TXS CP1:8



🟥 Spare TXS RD1:1
🟩 Spare TXS RD1:2
🟥 Spare TXS RD1:3
🟩 Spare TXS RD1:4
🟩 Spare TXS RD1:5
🟩 Spare TXS RD1:6
🟩 Spare TXS RD1:7
🟩 Spare TXS RD1:8

This means that as far as programming goes, you can configure either set of inputs, or even both

When programming both sets of inputs:

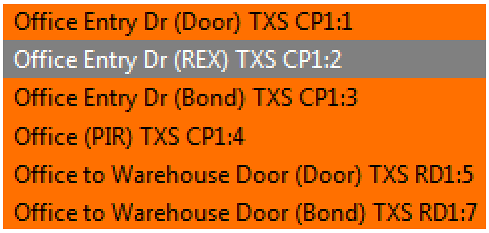
- Physical characteristics obey Controller input configuration
- Response speed will follow Controller input settings
- EOL resistance will follow Controller input settings
- Input inverted state will follow Controller input settings
- Non-physical characteristics are processed for both sets of inputs
- Events will be logged for both sets of inputs (if configured)
- Alarms in areas will be processed for both sets of inputs

Programming Efficiently

Now that you have programmed a number of inputs, we will look at how naming conventions will help us to program a system efficiently. This is particularly important on a large system.

Program the Office Area Inputs

1. Click the **Find** button and type **office** into the Label field.
2. Click **Ok**. You should get a list of six inputs.
3. Click on one of the inputs then press **CTRL + A** to select all
4. Now hold down the **CTRL** key and click on **Office Entry Dr (REX)** to deselect it.

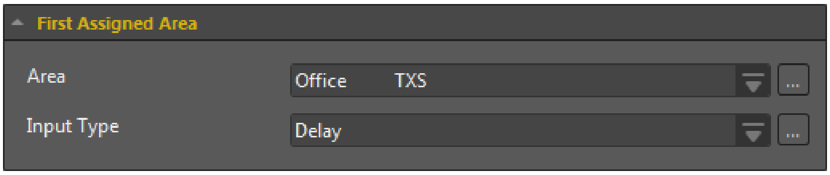


Office Entry Dr (Door) TXS CP1:1
Office Entry Dr (REX) TXS CP1:2
Office Entry Dr (Bond) TXS CP1:3
Office (PIR) TXS CP1:4
Office to Warehouse Door (Door) TXS RD1:5
Office to Warehouse Door (Bond) TXS RD1:7

You should end up with five inputs selected as shown.

Note that the **Door** and **Bond** inputs are being used to trigger an intruder alarm. Inputs on Reader Expanders can be used for alarm inputs as well as for access control. Both functions are processed separately.

5. Click the **Areas and Input Types** tab:



First Assigned Area

Area: Office TXS

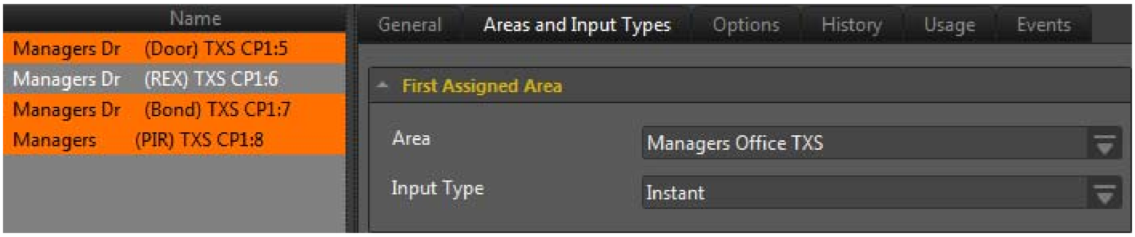
Input Type: Delay

- Set the **Area** to **Office TXS**
- Set the **Input** Type to **Delay**
- Click **Save**

You have now programmed all of the required Office area inputs.

Program the Managers Area Inputs

1. Now use the find tool again with the word **manager**. Select all but the REX input:



Name
Managers Dr (Door) TXS CP1:5
Managers Dr (REX) TXS CP1:6
Managers Dr (Bond) TXS CP1:7
Managers (PIR) TXS CP1:8

First Assigned Area

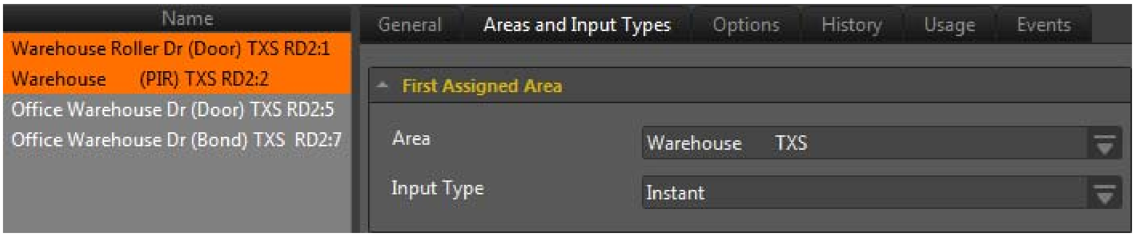
Area: Managers Office TXS

Input Type: Instant

2. Set the **Area** to **Managers Office** and the **Input Type** to **Instant**
3. Click **Save**

Program the Warehouse Area Inputs

1. Use the find tool again with the word **warehouse.** Select the first two inputs.

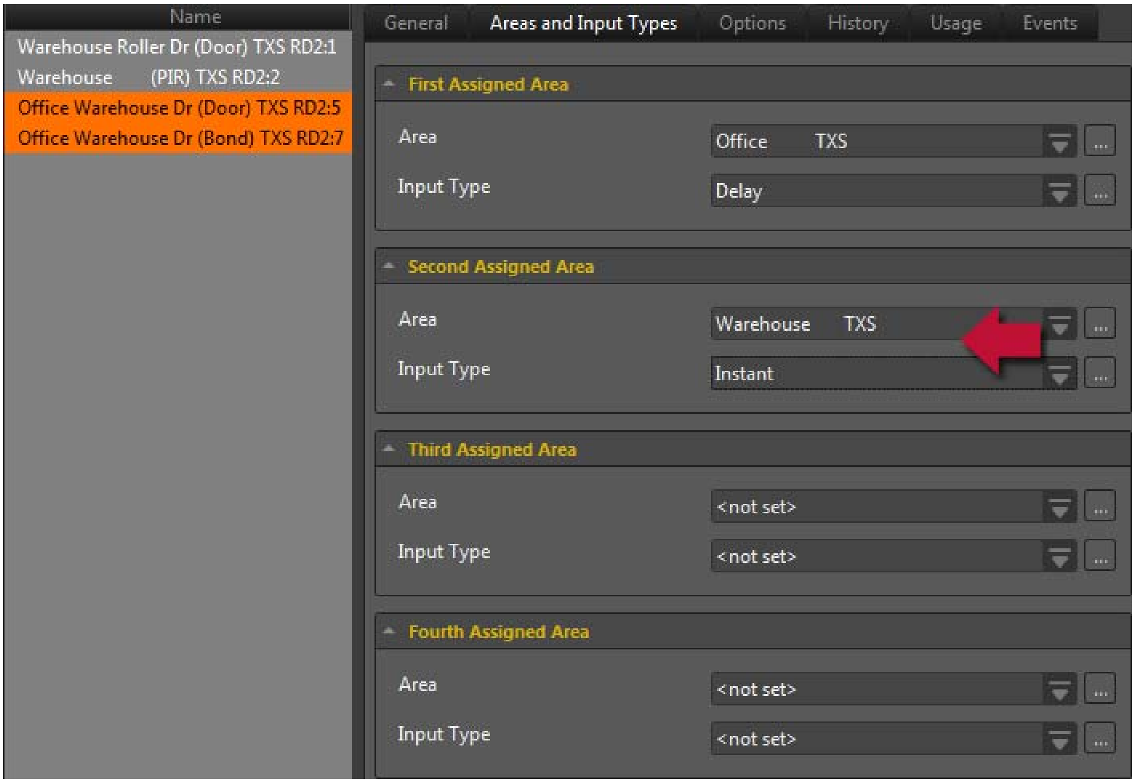


Name
Warehouse Roller Dr (Door) TXS RD2:1
Warehouse (PIR) TXS RD2:2
Office Warehouse Dr (Door) TXS RD2:5
Office Warehouse Dr (Bond) TXS RD2:7
General
Areas and Input Types
Options
History
Usage
Events
First Assigned Area

Area: Warehouse TXS

Input Type: Instant

2. Set the **Area** to **Warehouse** and the **Input Type** to **Instant**
3. Click **Save**
4. Now select the other two inputs. Note that they already have the Office area assigned
5. Assign the second **Area** of **Warehouse**
6. Assign the second **Input Type** of **Instant**



Name
Warehouse Roller Dr (Door) TXS RD2:1
Warehouse (PIR) TXS RD2:2
Office Warehouse Dr (Door) TXS RD2:5
Office Warehouse Dr (Bond) TXS RD2:7
General
Areas and Input Types
Options
History
Usage
Events

First Assigned Area

Area: Office TXS

Input Type: Delay

Second Assigned Area

Area: Warehouse TXS

Input Type: Instant

Third Assigned Area

Area: <not set>

Input Type: <not set>

Fourth Assigned Area

Area: <not set>

Input Type: <not set>

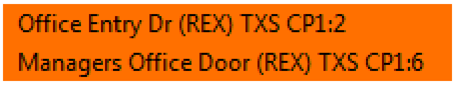
7. Click **Save**

Inputs can be assigned to multiple areas and with different input types. They are processed independently by each area.

Set the Input Speeds

Now that we have configured our areas, let's look at other ways to use the Find tool.

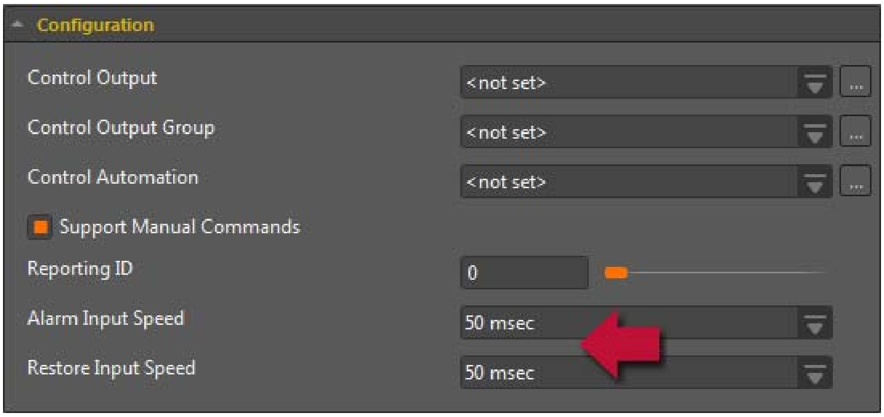
1. Click **Find** and type **(REX)** into the label field.
2. Click **Ok**. You should get a list of two inputs:



Office Entry Dr (REX) TXS CP1:2

Managers Office Door (REX) TXS CP1:6

3. Click on one of the inputs, then press CTRL + A to select all.
4. On the General tab, set the input speeds to **50 msec** and click **Save**.



Control Output: <not set>

Control Output Group: <not set>

Control Automation: <not set>

☑ Support Manual Commands

Reporting ID: 0

Alarm Input Speed: 50 msec

Restore Input Speed: 50 msec

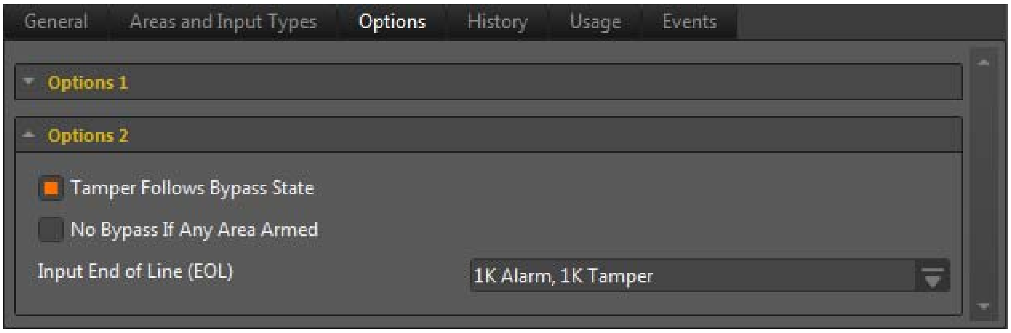
The default Input Speed is 500 msec. This means the input needs to be activated for half a second before it will trigger. This can be too slow for a Request to Exit button

Common Searches Using the Find Tool

There are some other common searches we can use:

- **TXS** : This will list all inputs belonging to the Texas site
- **TXS RD1** : This will list all inputs on Reader Expander 1 at the Texas site

These can be useful where EOL resistance needs to be set for a whole site or an entire expander.



☑ Tamper Follows Bypass State

□ No Bypass If Any Area Armed

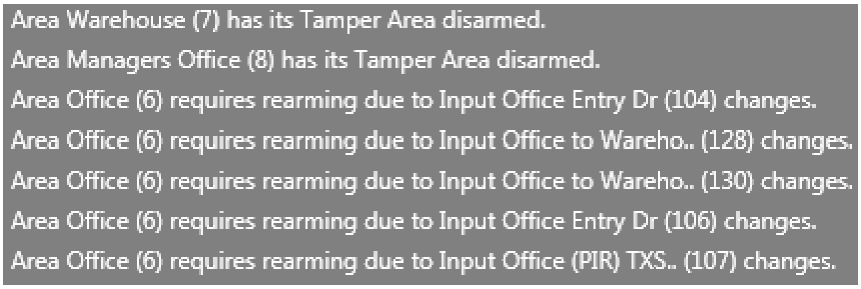
Input End of Line (EOL): 1K Alarm, 1K Tamper

To quickly find an available input when adding a new device, the find tool can be used with the word Spare.

Monitor the Health Status

You will find that your Controller health status is now showing 7.

1. Open the health status window.



```
Area Warehouse (7) has its Tamper Area disarmed.
Area Managers Office (8) has its Tamper Area disarmed.
Area Office (6) requires rearming due to Input Office Entry Dr (104) changes.
Area Office (6) requires rearming due to Input Office to Wareho.. (128) changes.
Area Office (6) requires rearming due to Input Office to Wareho.. (130) changes.
Area Office (6) requires rearming due to Input Office Entry Dr (106) changes.
Area Office (6) requires rearming due to Input Office (PIR) TXS.. (107) changes.
```

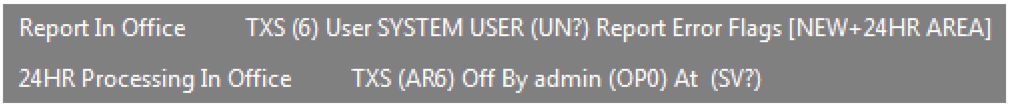
   The first two messages are in relation to the new areas that have been added but not yet armed.

   The next five messages are appearing because the inputs have had changes made that affect the operation on an area that is currently armed. In this case, it is because the 24 hour portion of the Office area is armed.

   This is a security feature that ensures programming cannot be changed to an armed Area without someone being notified.

2. From the Technician status page, disarm the Office 24 hour area.

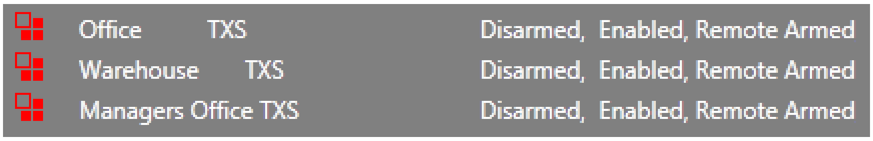
   Note that after the 24 hour area is disarmed, a report event is generated. This means that if offsite monitoring is configured, the monitoring station will be notified.



```
Report In Office        TXS (6) User SYSTEM USER (UN?) Report Error Flags [NEW+24HR AREA]
24HR Processing In Office        TXS (AR6) Off By admin (OP0) At  (SV?)
```

   The Controller health status should now drop to 3.

3. From the Technician status page arm the 24 Hour areas for the Office, Warehouse and Managers Office.

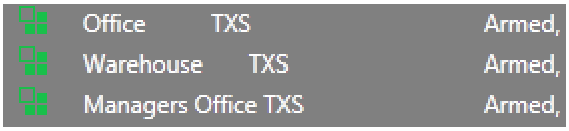


```
Office        TXS                  Disarmed,  Enabled, Remote Armed
Warehouse       TXS                Disarmed,  Enabled, Remote Armed
Managers Office TXS                Disarmed,  Enabled, Remote Armed
```

   The Controller health status should now be OK.

Testing Areas

1. Navigate to the **Technician** status page
2. Right click the **Office** area and select **Arm**
3. Click **Close**
4. Right click the **Warehouse** area and select **Arm**
5. Click **Close**
6. Right click the **Managers Office** area and select **Arm**
7. Click **Close**



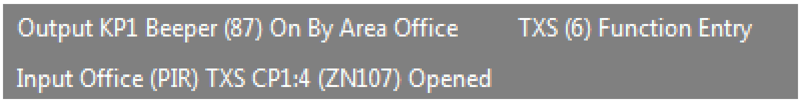
```
Office        TXS                Armed,
Warehouse     TXS                Armed,
Managers Office TXS              Armed,
```

All areas should go through the 10 second exit delay then change to armed.

Testing the Office Area

1. Open the Office (PIR) TXS CP1:4 input

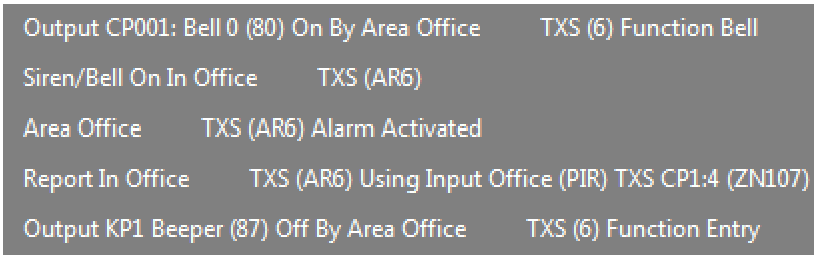
   This has been programmed as a Delay input type so should trigger the entry delay.

   ```
   Output KP1 Beeper (87) On By Area Office      TXS (6) Function Entry
   Input Office (PIR) TXS CP1:4 (ZN107) Opened
   ```

   In the All Events panel you should see the event for the input opening, followed by the Keypad Beeper being turned on by the Entry function of the Office area.

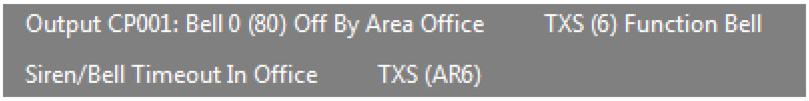
2. Once the entry delay has timed out, you should see the following:

   ```
   Output CP001: Bell 0 (80) On By Area Office      TXS (6) Function Bell
   Siren/Bell On In Office      TXS (AR6)
   Area Office      TXS (AR6) Alarm Activated
   Report In Office      TXS (AR6) Using Input Office (PIR) TXS CP1:4 (ZN107)
   Output KP1 Beeper (87) Off By Area Office      TXS (6) Function Entry
   ```

   - The keypad beeper is turned off by the entry function
   - A report is generated (this will send a zone alarm signal to offsite monitoring once configured)
   - The area alarm is activated
   - The siren/bell function is activated
   - The Bell 0 output is turned on by the bell function

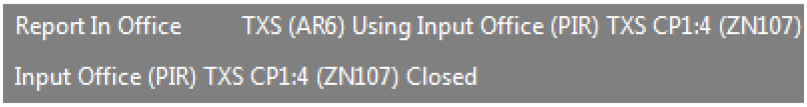
3. Leave the system in alarm for now.

   ```
   Output CP001: Bell 0 (80) Off By Area Office      TXS (6) Function Bell
   Siren/Bell Timeout In Office      TXS (AR6)
   ```

   After the **Alarm 1 Time** (1 minute as programmed in the area configuration) has expired, the siren/bell function will deactivate and the Bell 0 output will be turned off.

4. Close the **Office (PIR) TXS CP1:4** input

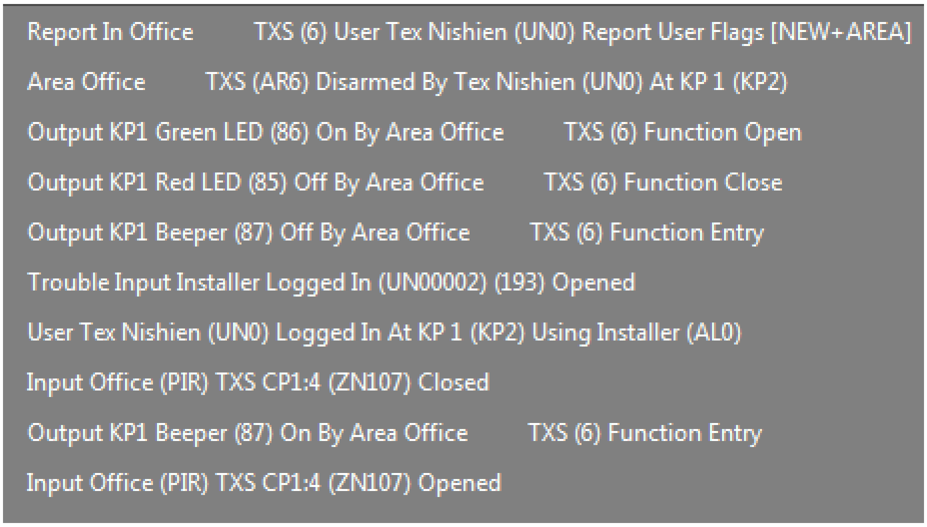


```
Report In Office        TXS (AR6) Using Input Office (PIR) TXS CP1:4 (ZN107)
Input Office (PIR) TXS CP1:4 (ZN107) Closed
```

An input closed event will be generated, then another report will be generated. This is the **Zone Restore** signal to offsite monitoring.

5. Open and close the **Office PIR** input again, but this time, log in at the keypad and disarm the area:

Press: 000000 [Enter] [Enter] [Disarm]

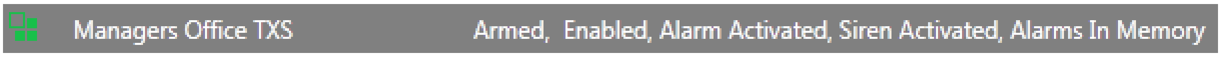


```
Report In Office        TXS (6) User Tex Nishien (UN0) Report User Flags [NEW+AREA]
Area Office        TXS (AR6) Disarmed By Tex Nishien (UN0) At KP 1 (KP2)
Output KP1 Green LED (86) On By Area Office        TXS (6) Function Open
Output KP1 Red LED (85) Off By Area Office        TXS (6) Function Close
Output KP1 Beeper (87) Off By Area Office        TXS (6) Function Entry
Trouble Input Installer Logged In (UN00002) (193) Opened
User Tex Nishien (UN0) Logged In At KP 1 (KP2) Using Installer (AL0)
Input Office (PIR) TXS CP1:4 (ZN107) Closed
Output KP1 Beeper (87) On By Area Office        TXS (6) Function Entry
Input Office (PIR) TXS CP1:4 (ZN107) Opened
```

As you can see, the event logging in Protege GX is very comprehensive and can be a great source for troubleshooting.

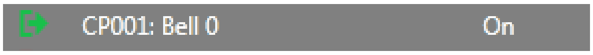
Testing the Managers Area

- Open the **Managers (PIR) TXS CP1:8** input. Note the area goes straight in to alarm:



```
Managers Office TXS        Armed,  Enabled, Alarm Activated, Siren Activated, Alarms In Memory
```

- This is because the inputs have been configured as **Instant** input types.
- Note also that the Controller Bell 0 has activated, but the keypad beeper has not:



```
CP001: Bell 0        On
```

Testing the Warehouse Area

- Open the **Warehouse (PIR) TXS RD2:2** input

  The Warehouse area should go straight in to alarm and the Bell 0 output should activate again.

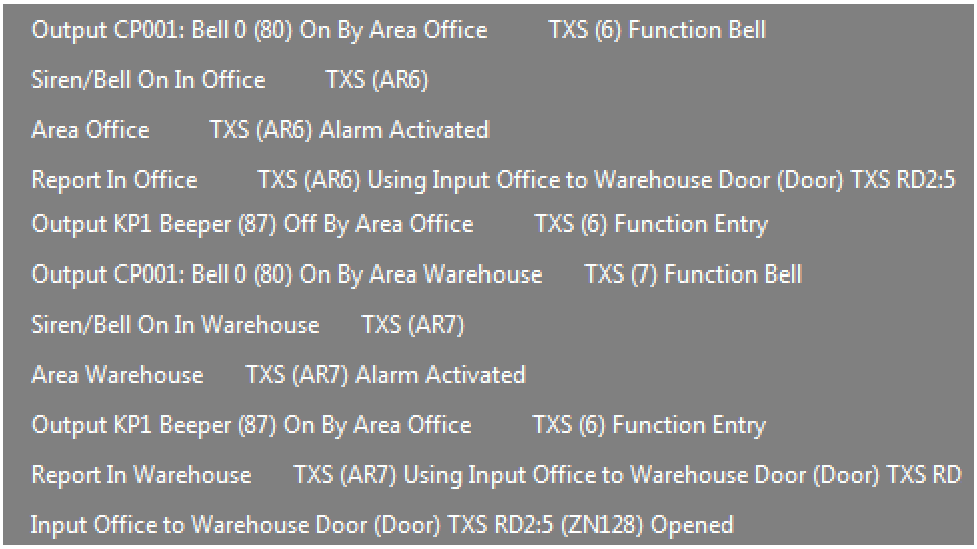
- You will also see that the **RD2 Lock 1** output activates for 5 seconds when you close the Warehouse (PIR) TXS RD2:2 input

  This is because Input 2 on a reader expander is configured by default for **REX** (Request to Exit). We will address this in a later module.

Testing Inputs Assigned to Multiple Areas

1. Arm the Office area again
2. Wait for the exit delay to expire
3. Open the Office to Warehouse Door (Door) TXS RD2:5 input

   This input is programmed for both the Office and Warehouse areas.



```
Output CP001: Bell 0 (80) On By Area Office        TXS (6) Function Bell
Siren/Bell On In Office        TXS (AR6)
Area Office        TXS (AR6) Alarm Activated
Report In Office        TXS (AR6) Using Input Office to Warehouse Door (Door) TXS RD2:5
Output KP1 Beeper (87) Off By Area Office        TXS (6) Function Entry
Output CP001: Bell 0 (80) On By Area Warehouse      TXS (7) Function Bell
Siren/Bell On In Warehouse      TXS (AR7)
Area Warehouse      TXS (AR7) Alarm Activated
Output KP1 Beeper (87) On By Area Office        TXS (6) Function Entry
Report In Warehouse      TXS (AR7) Using Input Office to Warehouse Door (Door) TXS RD
Input Office to Warehouse Door (Door) TXS RD2:5 (ZN128) Opened
```

   You can see that after the input opens, the Warehouse area goes into alarm instantly, whereas the Office area goes through entry delay first.

Testing Complete

We have now finished testing the configuration of our Areas.

- Disarm the Office area
- Disarm the Warehouse area
- Disarm the Managers Office area

Review Questions

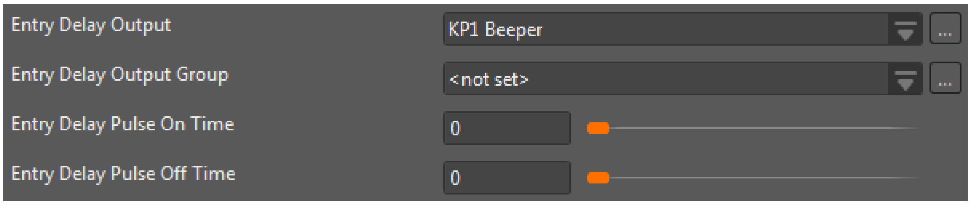
A short time after creating a new area, a health status message appears on the controller. What is this likely to be?

- □ The area is missing an Input Type
- □ The Controller requires a module update
- □ The new area has its Tamper or 24 hour area disarmed
- □ The area has no inputs programmed yet

Which characters from the area name programming will be shown on the keypad?

- □ The last 16 characters of the programmed name
- □ The first 20 characters of the programmed name
- □ The last 20 characters of the programmed name
- □ The first 16 characters of the programmed name

Explain the result of the setting shown in this image



Entry Delay Output	KP1 Beeper
Entry Delay Output Group	<not set>
Entry Delay Pulse On Time	0
Entry Delay Pulse Off Time	0

- □ The output will never be activated as the pulse times are both set to 0
- □ The output will be activated constantly when an entry delay input is triggered
- □ The output will be activated constantly while the area is arming
- □ The output will pulse rapidly while the area is arming

How many areas can an input be programmed to?

- □ One
- □ Two
- □ Four
- □ It depends on whether it is on a Reader Expander

What does the Input Type setting do?

- □ It sets how the input operates in the specified area
- □ It sets how the input operates in all areas
- □ It sets the Input name displayed in the keypad
- □ It sets whether input to use for an on-board expander

Which of the default input types should be used for a PIR that is covering the keypad at the main entry?

- □ Instant
- □ Delay
- □ Trouble Silent
- □ 24 Hour Alarm

Module 134: Basic Access Control

There are two main elements to access control:

- **Doors:** Used to control access by users or to monitor/control the flow of people into an area
- **Access Levels:** Used to control what users can do, where they can go, and when they can do these things

This module outlines how to configure these items to provide basic access control.

In This Module

Programming Doors

Navigate to **Programming | Doors.** You'll see that there are four doors already programmed:

- DR 1
- DR 2
- DR 3
- DR 4

This is because the Add Controller Wizard added the doors automatically.

Naming Doors

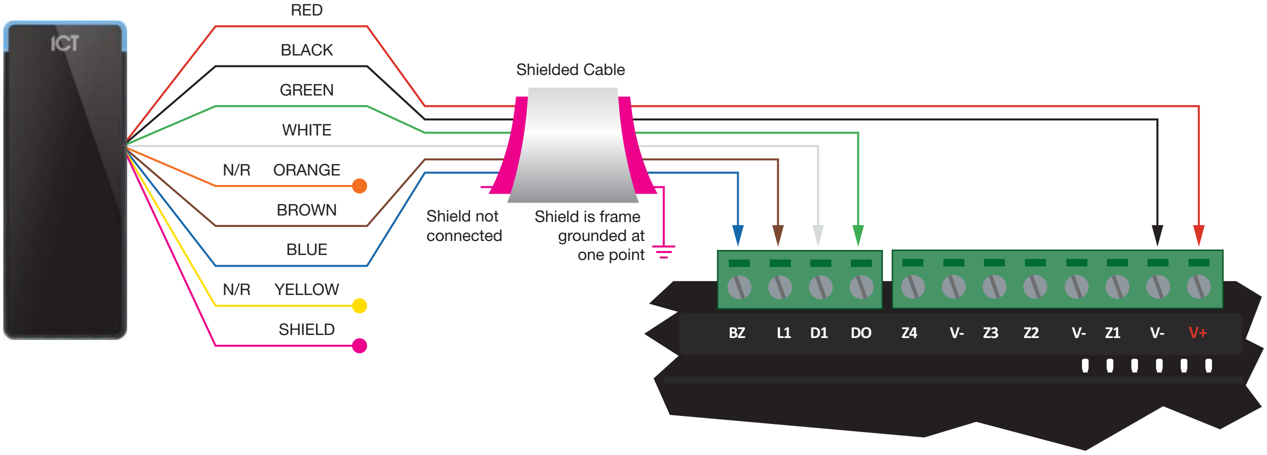
Using our naming conventions, name the four doors as follows:

- DR1 = Office Entry TXS
- DR2 = Managers Office TXS
- DR3 = Warehouse Roller TXS
- DR4 = Office to Warehouse TXS

We have chosen to put the Office Entry and Managers Office on the controller so that if there is a failure of the RS-485 or of the Reader Expander, we will still be able to gain access to the control equipment (located in the Managers Office)

Door Testing

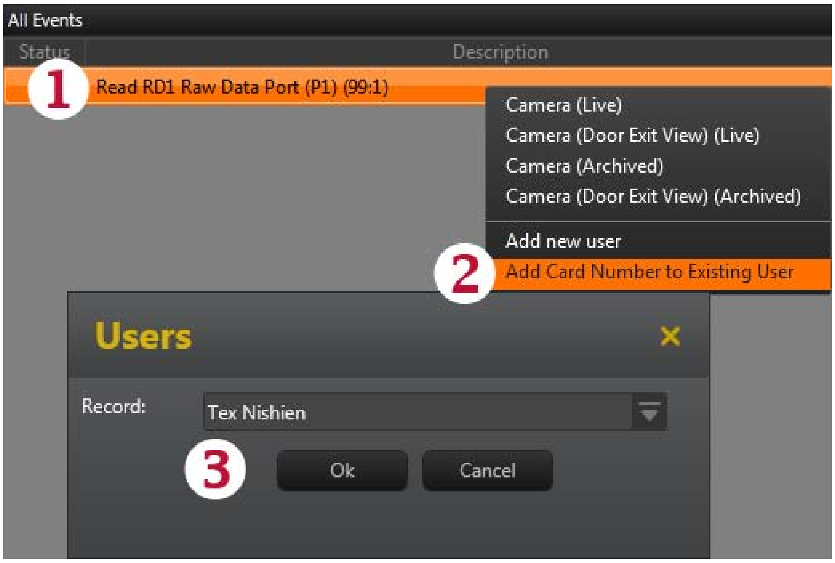
Wire a MultiProx reader into **Port 1** of the Controller and a NanoProx or Vario reader into **Port 2** of the Controller



Adding Cards from the Event Log

Badge the first training tag at the MultiProx reader. You should see an event come through, telling us that an unknown card has been read on Port 1

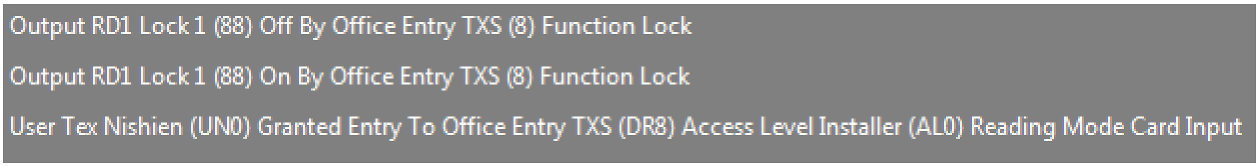
The numbers in the brackets at the end of the event - in this example (99:1) - represent the **Facility Code** and **Card Number**


All Events
Status
Description
1
Camera (Live)
Camera (Door Exit View) (Live)
Camera (Archived)
Camera (Door Exit View) (Archived)
Add new user
2
Add Card Number to Existing User
Users
3
Ok
Cancel

Read RD1 Raw Data Port (P1) (99:1)

Record: Tex Nishien

1. Right click on the event
2. Select **Add Card Number to Existing User**
3. Select the user you wish to add the card to then click **OK**
4. Once the download is complete, badge the card again. You should be granted entry to the door.



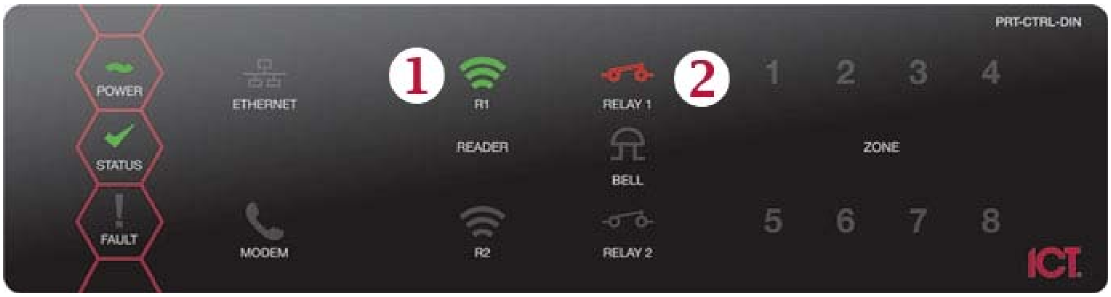
Output RD1 Lock 1 (88) Off By Office Entry TXS (8) Function Lock

Output RD1 Lock 1 (88) On By Office Entry TXS (8) Function Lock

User Tex Nishien (UN0) Granted Entry To Office Entry TXS (DR8) Access Level Installer (AL0) Reading Mode Card Input

Note that Lock 1 output is turned **on**, then **off** again 5 seconds later

5. Try badging again, and observe the LED indicators

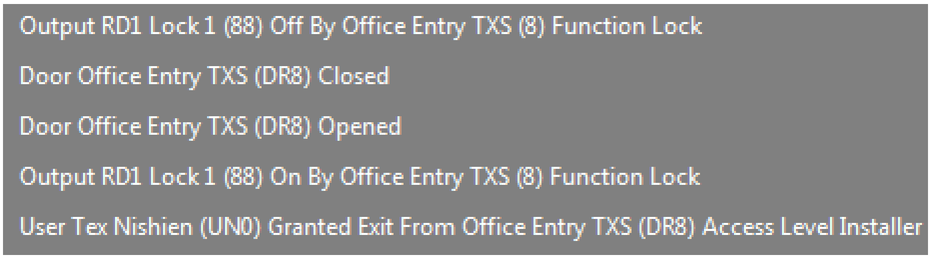


1. The **R1 LED** should pulse for 1 second during card read (correct format data read)
2. The **RELAY 1 LED** should pulse for 5 seconds

Door Processing

Door Sense

Badge your card at the reader, then open the Office Entry Dr (Door) TXS CP1:1 input (using the switch you wired earlier) for a second or two



Output RD1 Lock 1 (88) Off By Office Entry TXS (8) Function Lock

Door Office Entry TXS (DR8) Closed

Door Office Entry TXS (DR8) Opened

Output RD1 Lock 1 (88) On By Office Entry TXS (8) Function Lock

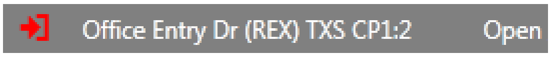
User Tex Nishien (UN0) Granted Exit From Office Entry TXS (DR8) Access Level Installer

This time you will see Door Opened and Closed events. Inputs 1 and 5 are configured by default as the **Door Sense** (Reed switch) inputs for the doors associated with a Reader Expander

Door Processing occurs independently of any areas the inputs may be associated with as alarm inputs

REX

1. Open the **Office Entry Dr (REX) TXS CP1:2** input

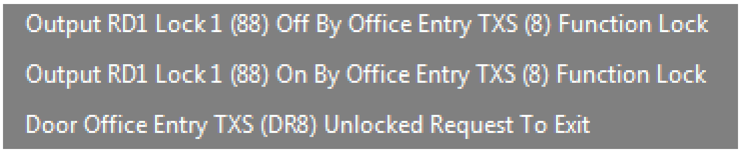
   

   Office Entry Dr (REX) TXS CP1:2 Open

   Note that the LED input on the Controller changes to **red** and the status changes to **open**, but the lock output does not change state

2. Close the **Office Entry Dr (REX) TXS CP1:2** input

   You will see an **Unlocked Request To Exit** event, followed by the lock output cycling for 5 seconds:

   Output RD1 Lock 1 (88) Off By Office Entry TXS (8) Function Lock

   Output RD1 Lock 1 (88) On By Office Entry TXS (8) Function Lock

   Door Office Entry TXS (DR8) Unlocked Request To Exit

REX inputs are inverted by default. This is because many push buttons only have NO (normally open) contacts which close when the button is pressed. Inputs 2 and 6 are configured by default as the **REX** (Request to Exit) inputs for the doors associated with a Reader Expander.

Bond Sense and REN

- Inputs 3 and 7 are configured as lock **Bond Sense** inputs for the doors associated with a Reader Expander

  By default, **Bond Sense** processing is **not** enabled

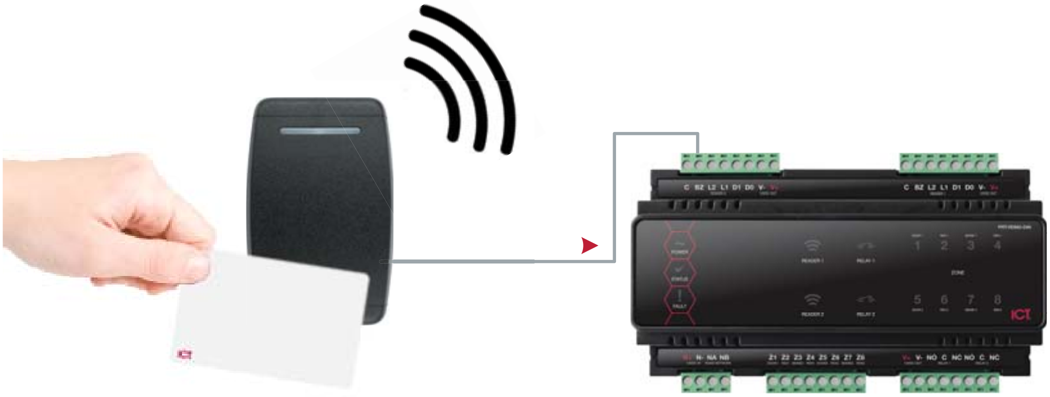
- Inputs 4 and 8 are configured as **REN** (Request to Enter) inputs for the doors associated with a Reader Expander

  By default, **REN** processing is **not** enabled

Bond Sense and REN processing must be enabled if required

Beeper

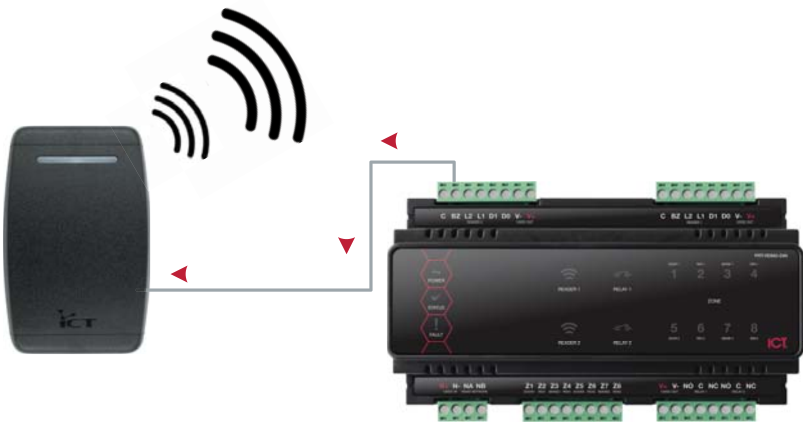
The beeper on an ICT reader can be controlled **internally** by the reader itself or **externally** by grounding the beeper wire.



Beep generated internally. Data sent to expander for processing.

The **first** beep that is emitted when a card is read is generated **internally** by the reader to acknowledge that the card has been read.

The **second** beep (or beeps) are generated by the access control system to advise whether access has been granted or denied.

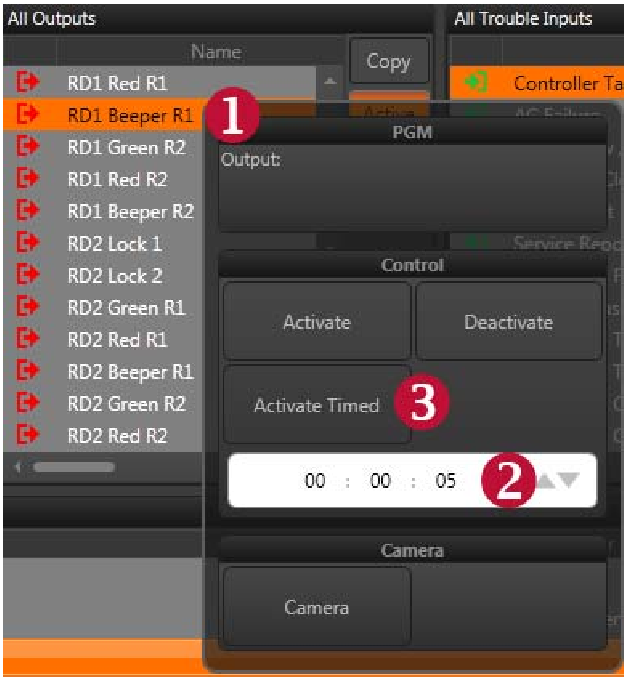


Beeps generated by Reader Expander supplying 12VDC to the beeper wire.

This is achieved by the reader expander grounding the beeper via the **BZ** output.

Reader Beepers

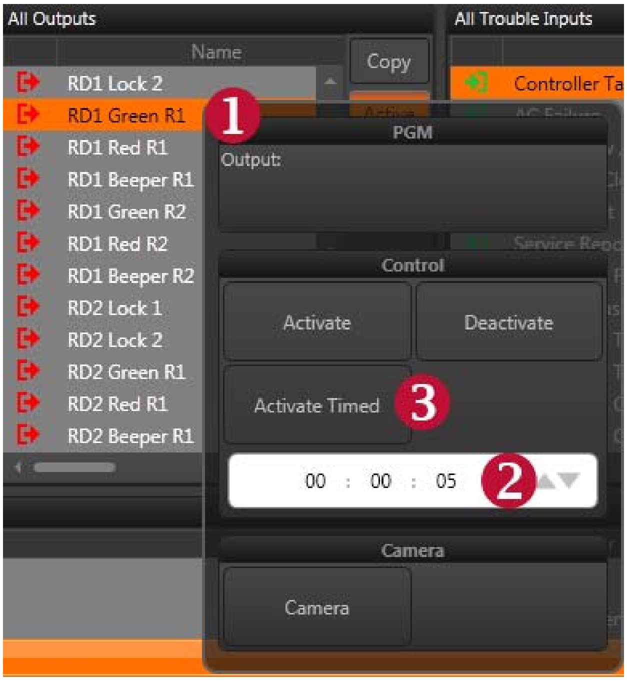
1. From the Technician status page, right click the **RD1 Beeper R1** output
2. Set a time of **5** seconds
3. Select **Activate Timed**



The Reader Expander **BZ** output can be controlled by Protege GX just like any other system output.

LEDs

1. From the Technician status page, right click the **RD1 Green R1** output
2. Set a time of **5** seconds
3. Select **Activate Timed**



Reader LED's can also be controlled by Protege GX

Reader Single LED Mode

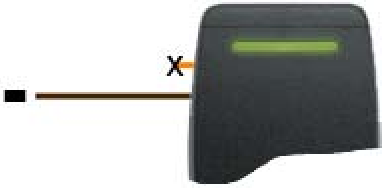
ICT Readers can be configured to operate in either single or dual LED mode. In single LED mode the **green LED** control wire (orange) is **not connected** to the Reader Expander. The **blue LED** control wire (brown) is connected to the **L1** output of the Reader Expander.

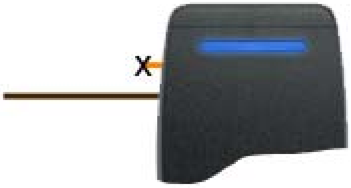
- Blue control line grounded

  The reader LED strip is GREEN

- Blue control line not grounded

  The reader LED strip is BLUE





ICT Readers are now shipped with single LED mode set

Reader Dual LED Mode

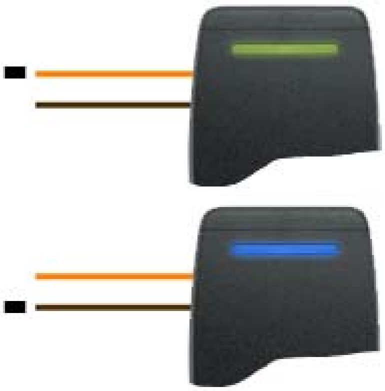
In dual LED mode the **green LED** control wire (orange) is connected to the **L1** output of the Reader Expander. The **blue LED** control wire (brown) is connected to the **L2** output of the Reader Expander.

- Green control line grounded

  The reader LED strip is GREEN

- Blue control line grounded

  The reader LED strip is BLUE



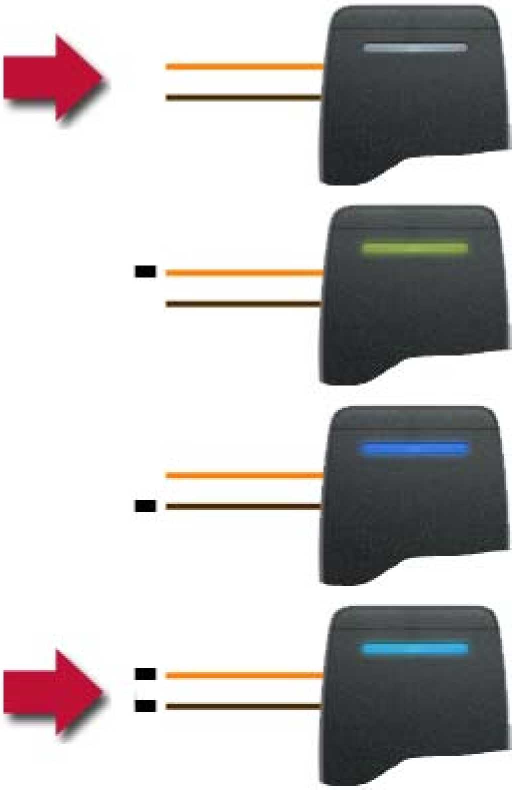
Dual LED mode allows two extra states of LED display: **No LED's** and **Both LED's.**

- Neither LED wire grounded

  The reader LED strip is OFF

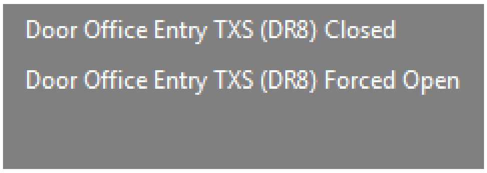
- Both control lines grounded

  The reader LED strip is CYAN



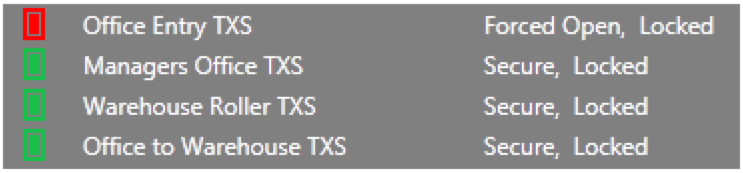
Door Monitoring

1. Open the **Office Entry Dr (Door) TXS CP1:1** input (using the switch you wired earlier)



Door Office Entry TXS (DR8) Closed

Door Office Entry TXS (DR8) Forced Open

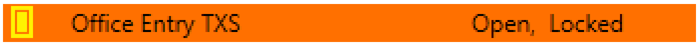


🟥	Office Entry TXS	Forced Open, Locked
🟩	Managers Office TXS	Secure, Locked
🟩	Warehouse Roller TXS	Secure, Locked
🟩	Office to Warehouse TXS	Secure, Locked

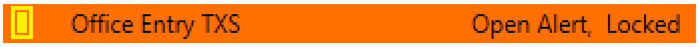
You should see a Door Forced Open event, and see the status update on the Technician status page

2. Close the **Office Entry Dr (Door) TXS CP1:1** input
3. Badge the Installer card
4. Open the **Office Entry Dr (Door) TXS CP1:1** input (to simulate the door opening)

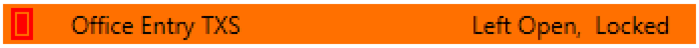
Leave the input open this time and observe what happens:



🟨 Office Entry TXS Open, Locked



🟨 Office Entry TXS Open Alert, Locked



🟥 Office Entry TXS Left Open, Locked

1. The door opens
2. After 30 seconds an alert is generated
3. After 45 seconds a DOTL (Door Open too Long) alarm is generated

Managers Door

The Office Entry door is now mostly configured according to our system design.

1. Badge your card at the Managers Office reader
2. Open the **Managers Dr (Door) TXS CP1:5** input
3. Close the **Managers Dr (Door) TXS CP1:5** input
4. Open the **Managers Dr (REX) TXS CP1:6** input
5. Close the **Managers Dr (REX) TXS CP1:6** input

You should find that the Managers Office door functions correctly, and needs no further configuration.

Configuring Doors

As you can see, basic configuration is completed by the Add Controller Wizard. All that is required now is configuring any additional options required. We'll come back to this later.

Next, we'll take a look at controlling access with **Access Levels** and **Groups**.

Configuring Access Levels

Access Levels are used to control **what** users can do, **where** they can go, and **when** they can do these things. They determine the doors, areas, elevator floors and menu groups a user has access to.

The tidiest way to define this access is using **groups**.

Door Groups

Navigate to **Groups | Door Groups**. You will see a default door group called **All Doors**. This is created by the system and cannot be deleted or changed.

Whenever a new door is created, it will be added to the **All Doors** door group automatically. **Because of this, use of the All Doors door group should be used with caution.** An example of where this would be a problem would be at a research institute dealing with dangerous substances. If a new door was created in the system that controls access to a biohazard area, anyone with the All Doors door group would automatically have access to this door.

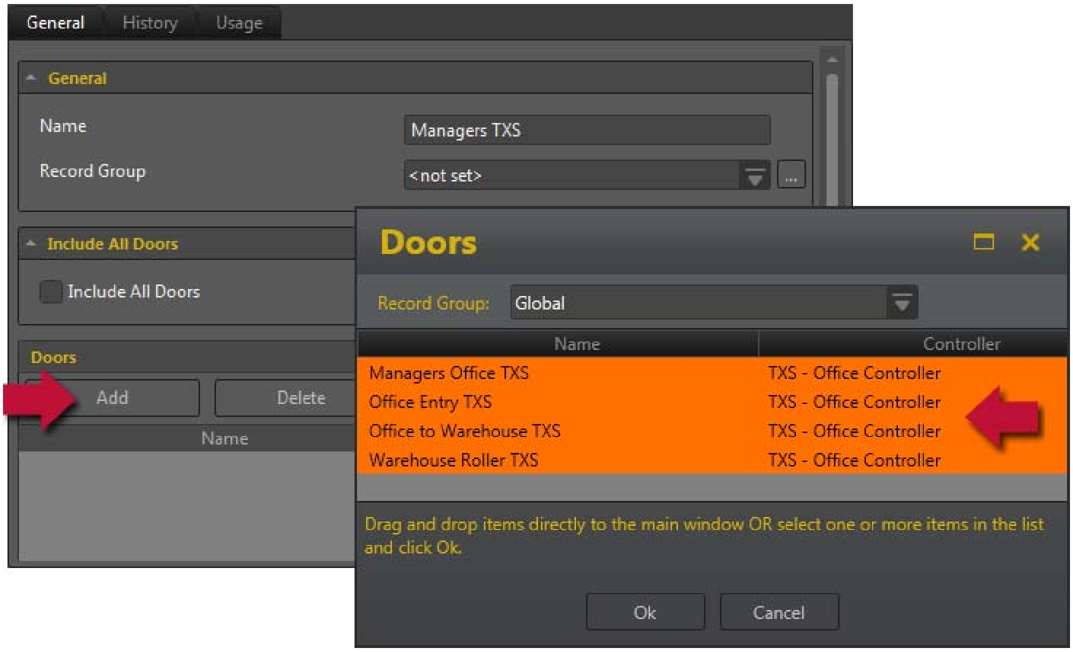
In the case of our Acme scenario, it is acceptable for our Installer to have this group assigned.

Adding Door Groups

Add the Managers Door Group

We could also assign the **All Doors** door group to our Manager access level, however to follow good practice, we'll create a new door group for the Manager.

1. Click the **Add** button on the main toolbar
2. Name the door group **Managers TXS**
3. Click **Save** to create the group
4. Click **Add** to open the Doors selection window... This display all doors in the system that are not already in the group



Name: Managers TXS

Record Group: <not set>

□ Include All Doors

Name

Record Group: Global

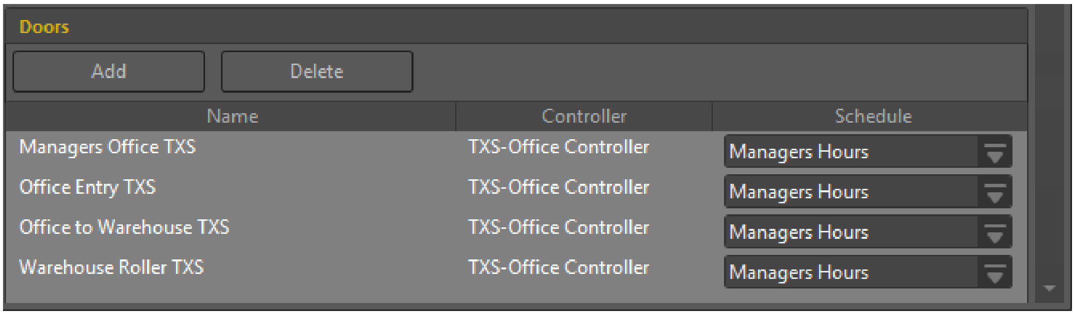
Name	Controller
Managers Office TXS	TXS - Office Controller
Office Entry TXS	TXS - Office Controller
Office to Warehouse TXS	TXS - Office Controller
Warehouse Roller TXS	TXS - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

5. Select all four doors. This can be done by dragging each door from the list and dropping them on to the main window, or by selecting the doors (use CTRL+A to select all) and clicking **OK**

   The doors now appear in the list with a schedule beside them...

   By default, Protege GX assigns the system-created **Always** schedule to the group



Name	Controller	Schedule
Managers Office TXS	TXS-Office Controller	Managers Hours
Office Entry TXS	TXS-Office Controller	Managers Hours
Office to Warehouse TXS	TXS-Office Controller	Managers Hours
Warehouse Roller TXS	TXS-Office Controller	Managers Hours

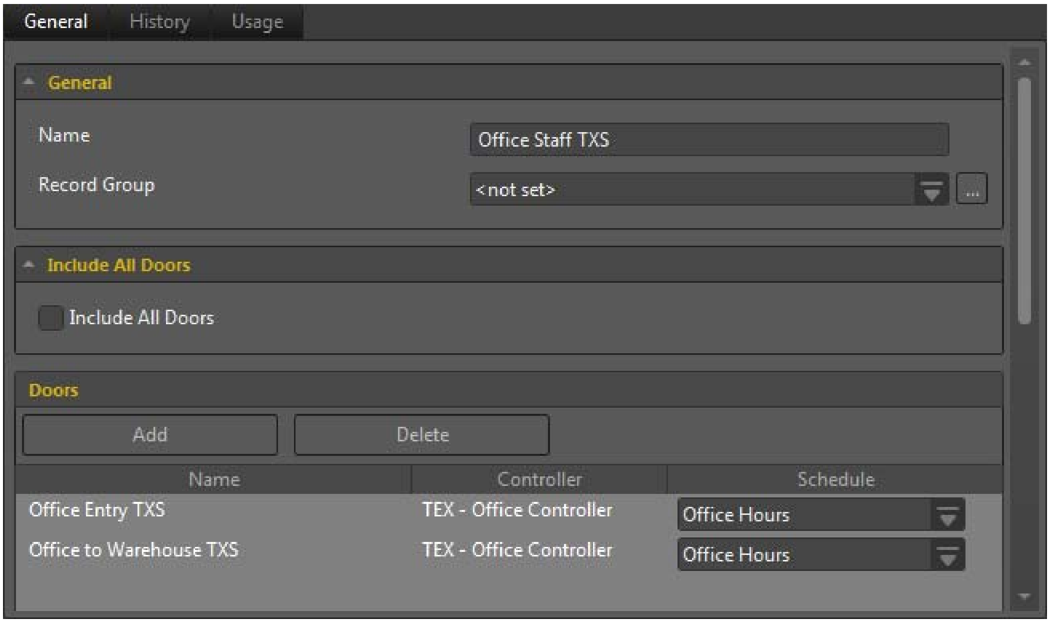
6. Change the schedule to the **Managers Hours** schedule

   This will provide the same functionality as the Always schedule, but means that if the requirements change at a later date and the Manager should no longer have 24/7 access, we would simply need to update the Managers Hours schedule rather than having to find everything that was using the Always schedule.

7. Click **Save**.

Add the Office Staff Door Group

1. Create a new door group called Office Staff TXS
2. Add the two office doors



Name: Office Staff TXS

Record Group: <not set>

□ Include All Doors

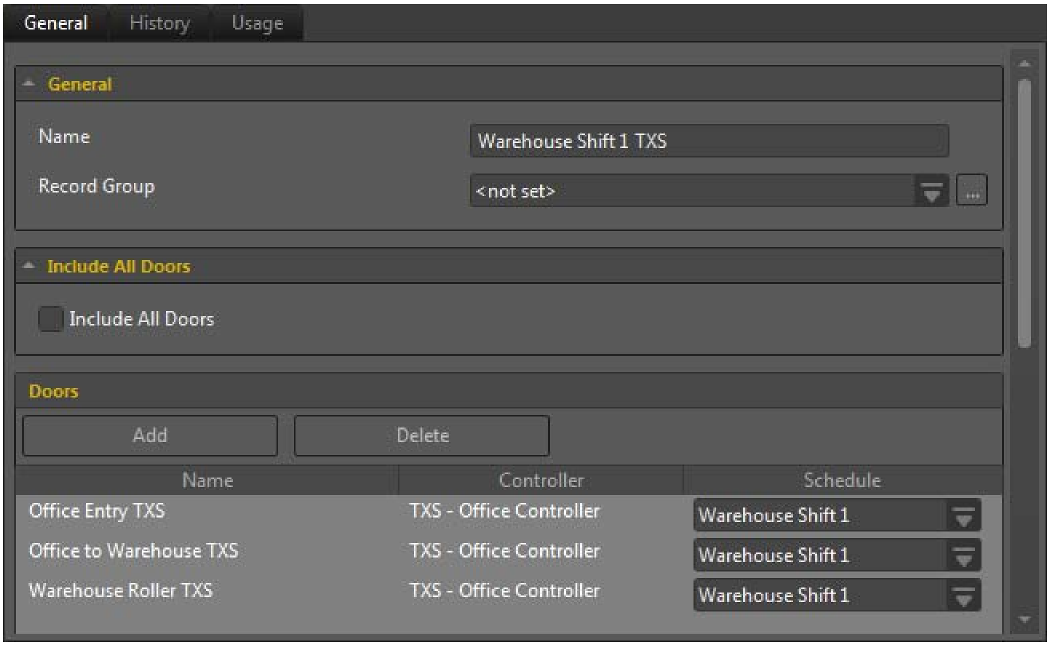
Name	Controller	Schedule
Office Entry TXS	TEX - Office Controller	Office Hours
Office to Warehouse TXS	TEX - Office Controller	Office Hours

3. Assign the Office Hours schedule

In our system design, it was specified that the office staff will have access to the Warehouse only when warehouse staff are present. We still need to give them access to the door, but we will configure the rest later.

Add the Warehouse Staff Door Group

1. Create 2 further door groups for:
   - Warehouse Shift 1 TXS and
   - Warehouse Shift 2 TXS
2. Add the doors required by the warehouse staff:
   - Office Entry
   - Office to Warehouse, and
   - Warehouse Roller
3. Assign the appropriate **schedules** (shift 1 or shift 2)



Name: Warehouse Shift 1 TXS

Record Group: <not set>

□ Include All Doors

Name	Controller	Schedule
Office Entry TXS	TXS - Office Controller	Warehouse Shift 1
Office to Warehouse TXS	TXS - Office Controller	Warehouse Shift 1
Warehouse Roller TXS	TXS - Office Controller	Warehouse Shift 1

Again, we will configure the office restriction later...

Adding Area Groups

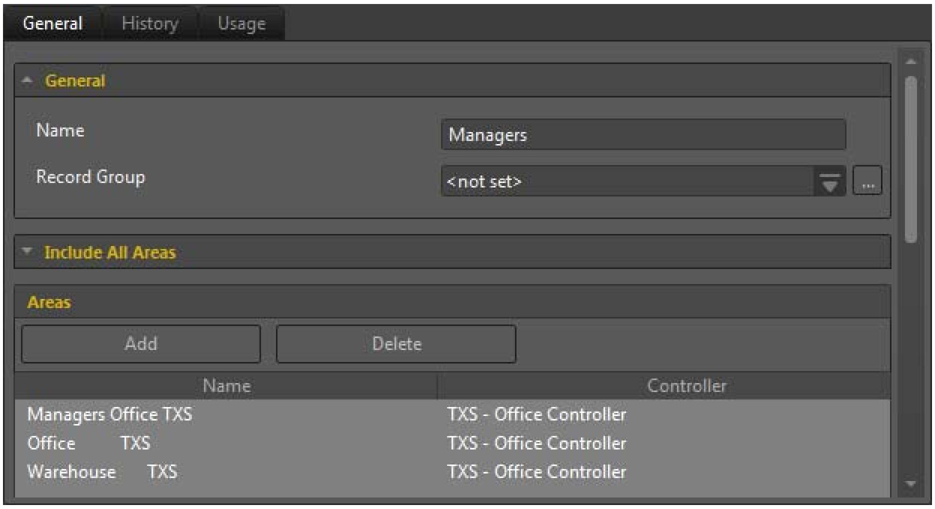
Add the Managers Area Group

1. Navigate to **Groups | Area Groups**

   You will see a default area group called **All Areas**. This is created by the system and cannot be deleted or changed. Whenever a new area is created, it is added to the **All Areas** group automatically. Use of the **All Areas** area group should be made with caution.

2. In the same way we created the Managers door group, add a new area group called **Managers**

3. Add all three areas



Name: Managers

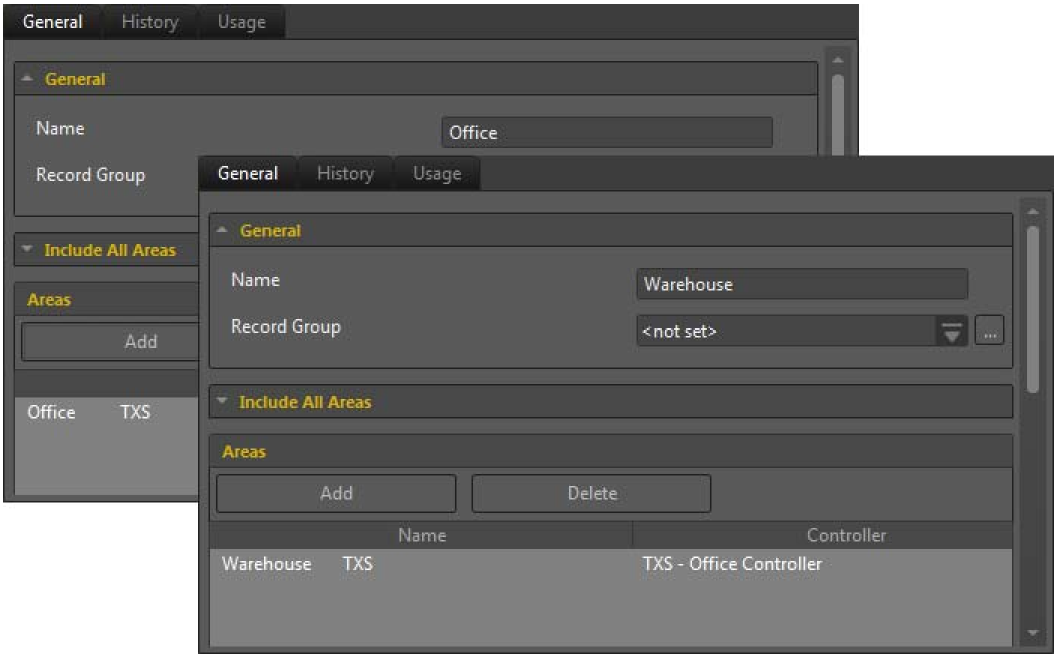
Record Group: <not set>

Name	Controller
Managers Office TXS	TXS - Office Controller
Office TXS	TXS - Office Controller
Warehouse TXS	TXS - Office Controller

4. Click **Save**

Add Additional Area Groups

Now create an **Office** area group with only the Office area, and a **Warehouse** area group with only the Warehouse area:



Name: Office

Record Group

Name
Office TXS

Name: Warehouse

Record Group: <not set>

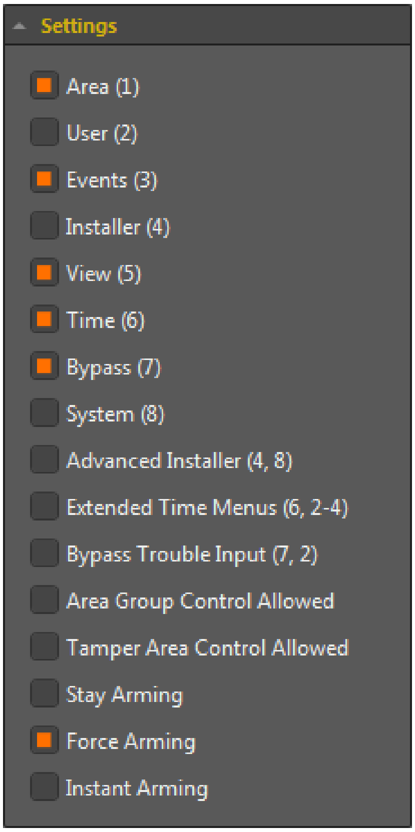
Name	Controller
Warehouse TXS	TXS - Office Controller

Adding Menu Groups

Add the Managers Menu Group

The final thing we need to configure is **Menu Groups**. Menu groups control access to keypads. They define **what** a user can do at a keypad, but not which areas the user has access to.

1. Navigate to **Groups | Menu Groups**
2. Add a new menu group called **Manager**
3. Select (enable) the following settings:
   - **Areas (1):** Area Control
   - **Events (3):** View Events
   - **View (5):** View other system information
   - **Time (6):** Set the Controller time
   - **Bypass (7):** Bypass Inputs
   - **Force Arming:** Force arm the system

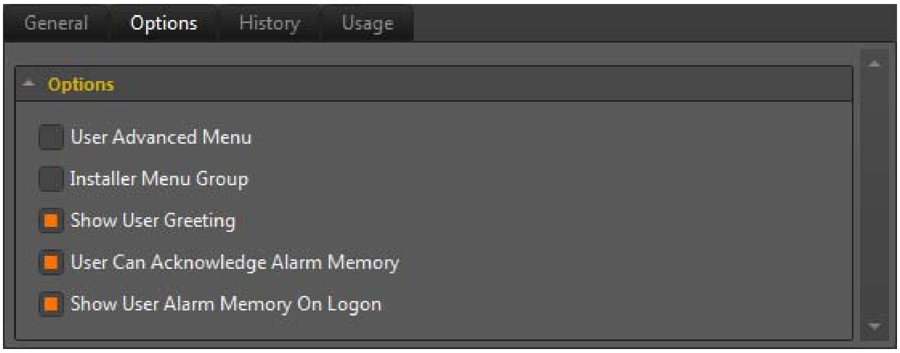


Settings

☑ Area (1)
☐ User (2)
☑ Events (3)
☐ Installer (4)
☑ View (5)
☑ Time (6)
☑ Bypass (7)
☐ System (8)
☐ Advanced Installer (4, 8)
☐ Extended Time Menus (6, 2-4)
☐ Bypass Trouble Input (7, 2)
☐ Area Group Control Allowed
☐ Tamper Area Control Allowed
☐ Stay Arming
☑ Force Arming
☐ Instant Arming

Set Menu Group Options

1. Click the **Options** tab and select (enable) the following options:



Options

☐ User Advanced Menu
☐ Installer Menu Group
☑ Show User Greeting
☑ User Can Acknowledge Alarm Memory
☑ Show User Alarm Memory On Logon

This will allow the manager to see any alarm activations when they log in

2. Click **Save**

Add an Additional Menu Group

1. Add another menu group called **Staff**
2. Check the **Area (1)** setting to allow area control
3. Under the **Options** tab select (enable) the **Show User Greeting** option
4. Click **Save**

We have now created all of the groups we need...

Configure Access Levels

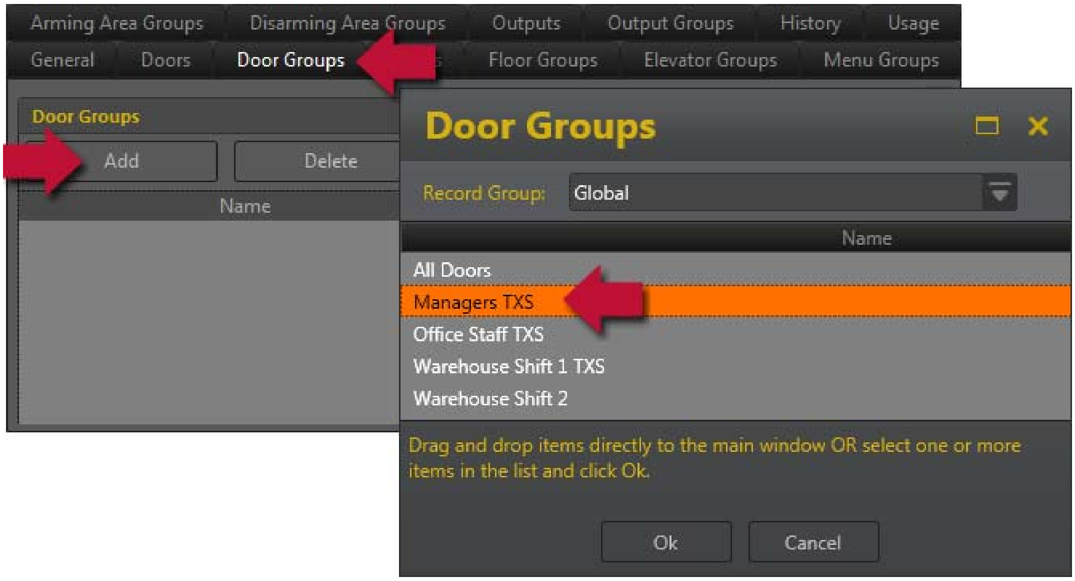
Navigate to **Users | Access Levels**. You should have six access levels programmed:

- Installers
- Manager
- Office
- Warehouse Shift 1
- Warehouse Shift 2
- Warehouse Supervisor

The Installers access level was created manually. The others were created by the Import Users Wizard, but have not yet been configured.

Configure the Managers Access Level

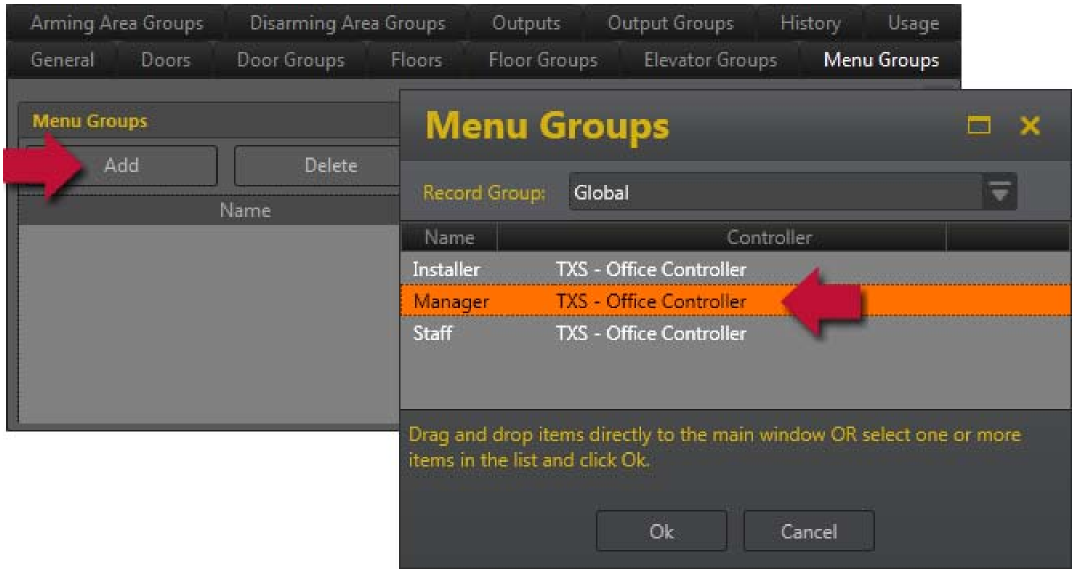
1. Select the **Managers** access level
2. Select the **Door Groups** tab and click **Add** to open the Door Groups selection window



Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

3. Select the door group **Managers TXS** and click **Ok**
4. Click **Save**
5. Select the **Menu Groups** tab and click **Add**

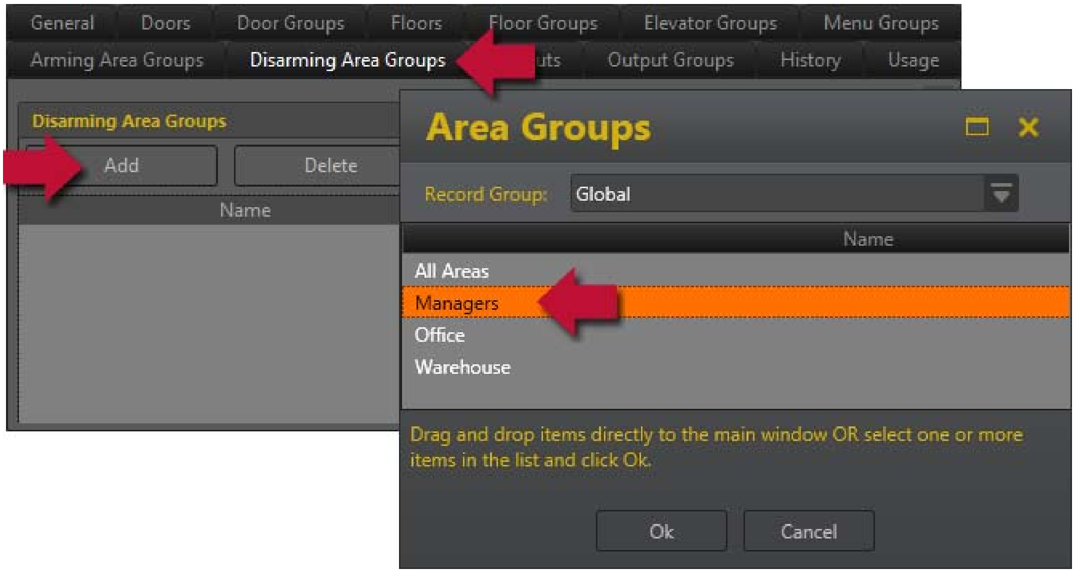
6. Select the **Manager** menu group and click **OK**



Name	Controller
Installer	TXS - Office Controller
Manager	TXS - Office Controller
Staff	TXS - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

7. Click **Save**
8. Select the **Disarming Area Groups** tab and click **Add**
9. Select the **Managers** area group and click **OK**



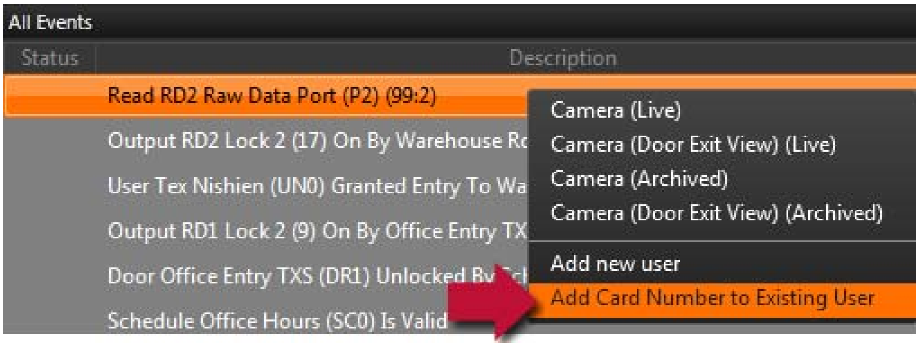
Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

10. Click **Save**

Remember that if we allow a user to **Disarm** an area, the system will automatically allow them to **Arm** the area.

Testing the Managers Access Level

1. Badge Card Number 2 at a reader

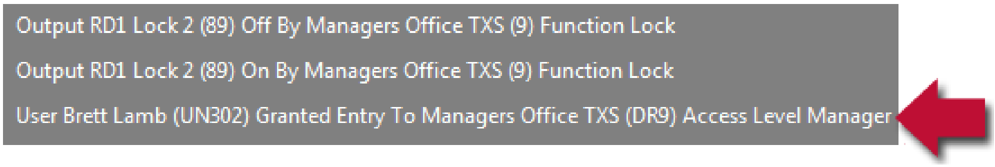


All Events
Status
Description
Camera (Live)
Camera (Door Exit View) (Live)
Camera (Archived)
Camera (Door Exit View) (Archived)
Add new user
Add Card Number to Existing User

```
Read RD2 Raw Data Port (P2) (99:2)
Output RD2 Lock 2 (17) On By Warehouse Rc
User Tex Nishien (UN0) Granted Entry To Wa
Output RD1 Lock 2 (9) On By Office Entry TX
Door Office Entry TXS (DR1) Unlocked By Scl
Schedule Office Hours (SC0) Is Valid
```

Right click the event and assign the card to our Manager **Brett Lamb**

2. Wait 5 seconds, then badge the card again. Access should now be granted:

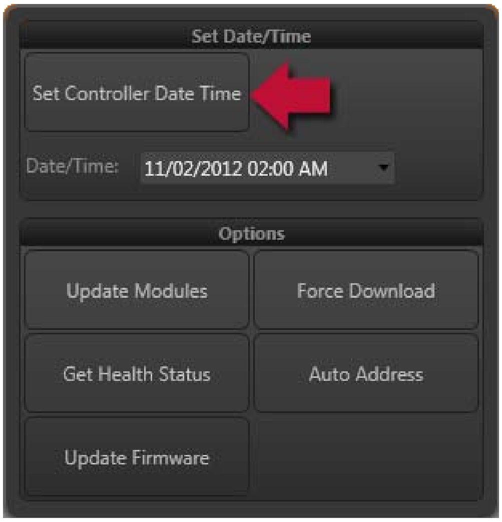


```
Output RD1 Lock 2 (89) Off By Managers Office TXS (9) Function Lock
Output RD1 Lock 2 (89) On By Managers Office TXS (9) Function Lock
User Brett Lamb (UN302) Granted Entry To Managers Office TXS (DR9) Access Level Manager
```

3. Log in at the keypad using Brett's code of **9998**

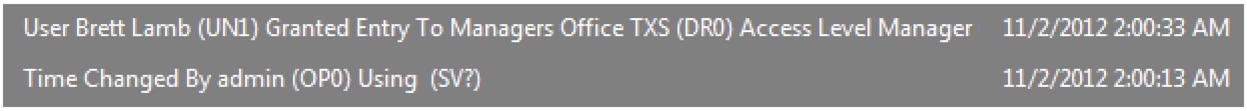
   Note the areas he has access to

4. Press the **[Menu]** key and scroll up to see the menus he has access to
5. Navigate to **Sites | Controllers** and right click on the Controller



Date/Time: 11/02/2012 02:00 AM

6. Set the time to **2:00AM**
7. Try badging the Managers card again

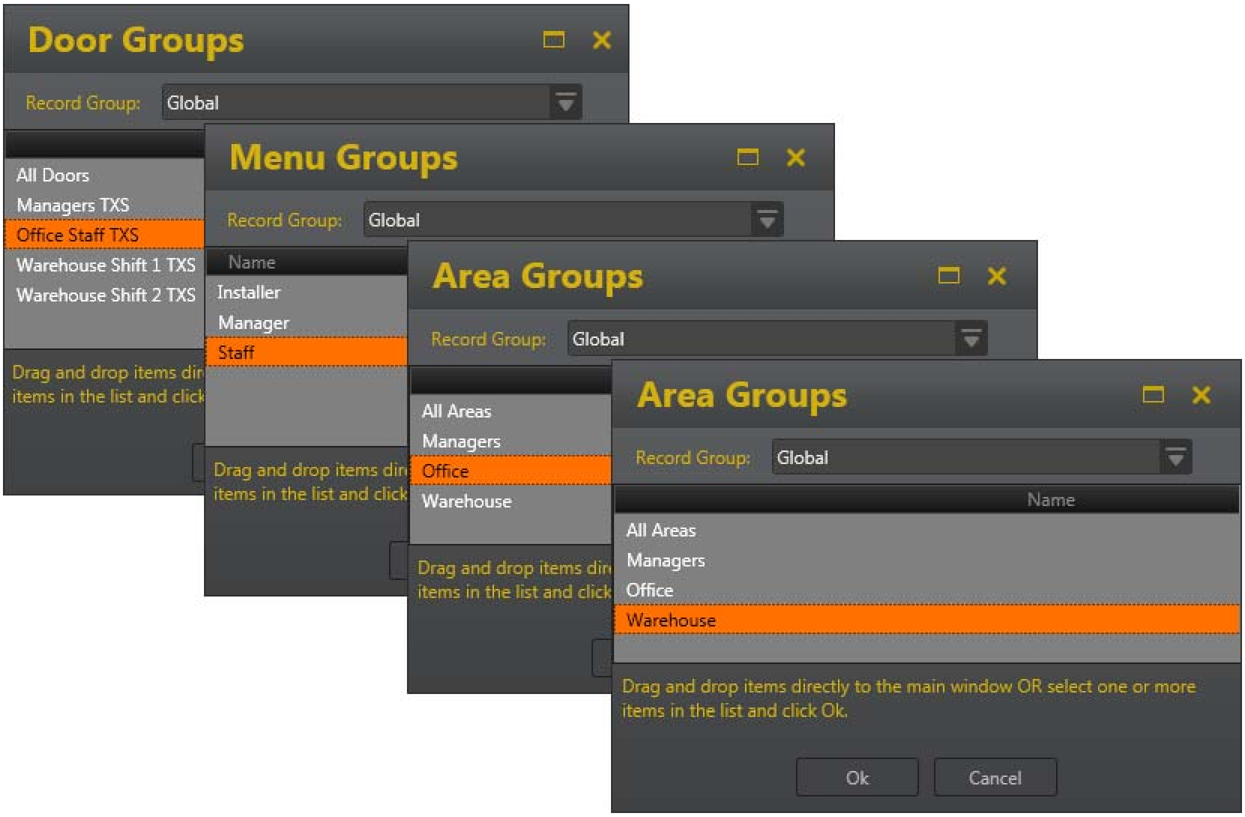


```
User Brett Lamb (UN1) Granted Entry To Managers Office TXS (DR0) Access Level Manager   11/2/2012 2:00:33 AM
Time Changed By admin (OP0) Using  (SV?)                                                 11/2/2012 2:00:13 AM
```

Notice how Brett is allowed access at 2am. This is because the door group assigned to the access level is set to use the Managers Hours schedule, providing 24/7 access.

Configure the Office Access Level

1. Navigate to **Users | Access Levels** and select the **Office** access level
2. Add the **Office Staff** door group
3. Add the **Staff** menu group
4. Add the **Office** area group to the Disarming Area Groups tab
5. Add the **Warehouse** area group to the Arming Area Groups tab

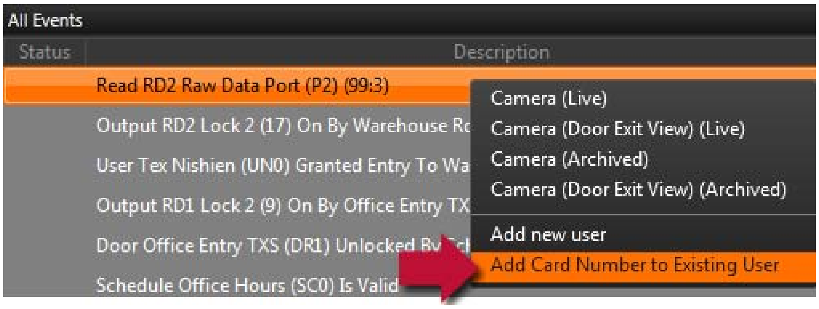


6. Click **Save**

Testing the Office Access Level

1. Badge Card Number 3 at a reader

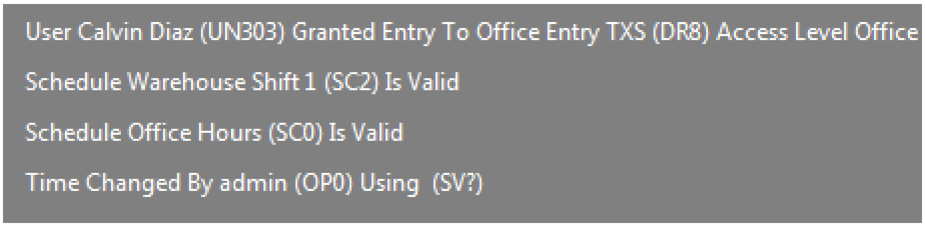
   Right click the event and assign the card to one of our office staff **Calvin Diaz**


All Events
Status
Description
Read RD2 Raw Data Port (P2) (99:3)
Output RD2 Lock 2 (17) On By Warehouse Ro
User Tex Nishien (UN0) Granted Entry To Wa
Output RD1 Lock 2 (9) On By Office Entry TX
Door Office Entry TXS (DR1) Unlocked By Sch
Schedule Office Hours (SC0) Is Valid
Camera (Live)
Camera (Door Exit View) (Live)
Camera (Archived)
Camera (Door Exit View) (Archived)
Add new user
Add Card Number to Existing User

2. Wait a few seconds, then badge the card again

   You should be **denied** entry as the Office staff are not allowed access outside of office hours.

3. Navigate to **Sites** | **Controllers** and right click on the Controller
4. Set the time to **9:30AM**
5. Try badging Calvin's card again



```
User Calvin Diaz (UN303) Granted Entry To Office Entry TXS (DR8) Access Level Office
Schedule Warehouse Shift 1 (SC2) Is Valid
Schedule Office Hours (SC0) Is Valid
Time Changed By admin (OP0) Using  (SV?)
```

You will see the **Office** and **Warehouse Shift 1** schedules go valid, and then Calvin is granted access.

6. Log in at the keypad using Calvin's code of **9779**

   Note the areas he has access to

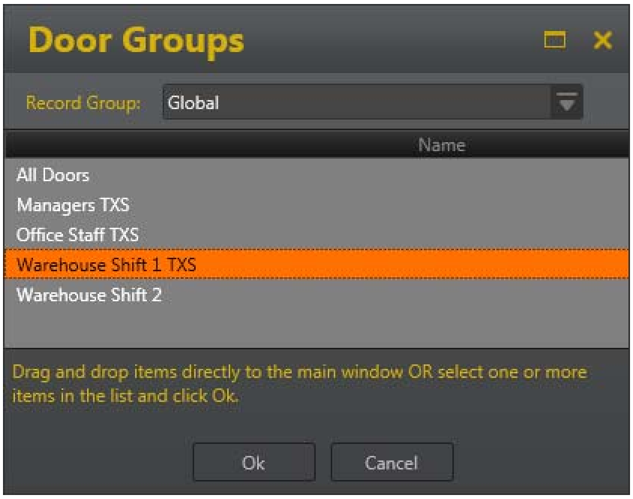
7. Press the **[Menu]** key and scroll up to see the menus he has access to
8. Press **[Enter]**
9. Select the Warehouse area and press **[Arm]**

Note how the Warehouse area now drops off Calvin's list of areas. This is because he is only allowed to **Arm** the Warehouse area.

You'll also see that Calvin is automatically logged out. This is because the menu group assigned to him does not have the **Installer Menu Group** option checked.

Configure the Warehouse Shift 1 Access Level

1. Select the **Warehouse Shift 1** access level
2. Add the **Warehouse Shift 1** door group



Door Groups

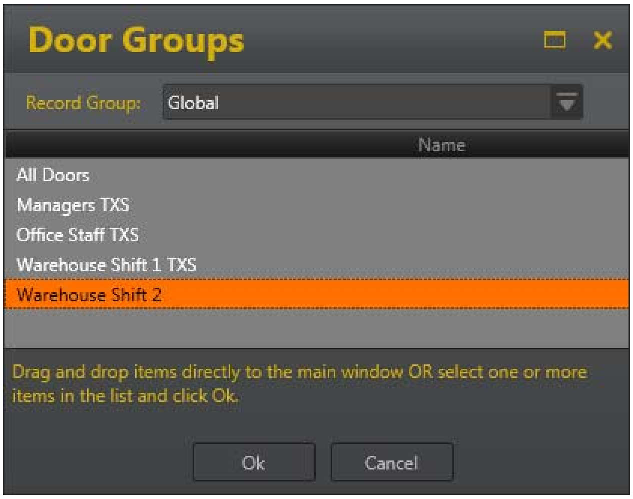
Record Group: Global

Name
All Doors
Managers TXS
Office Staff TXS
Warehouse Shift 1 TXS
Warehouse Shift 2

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

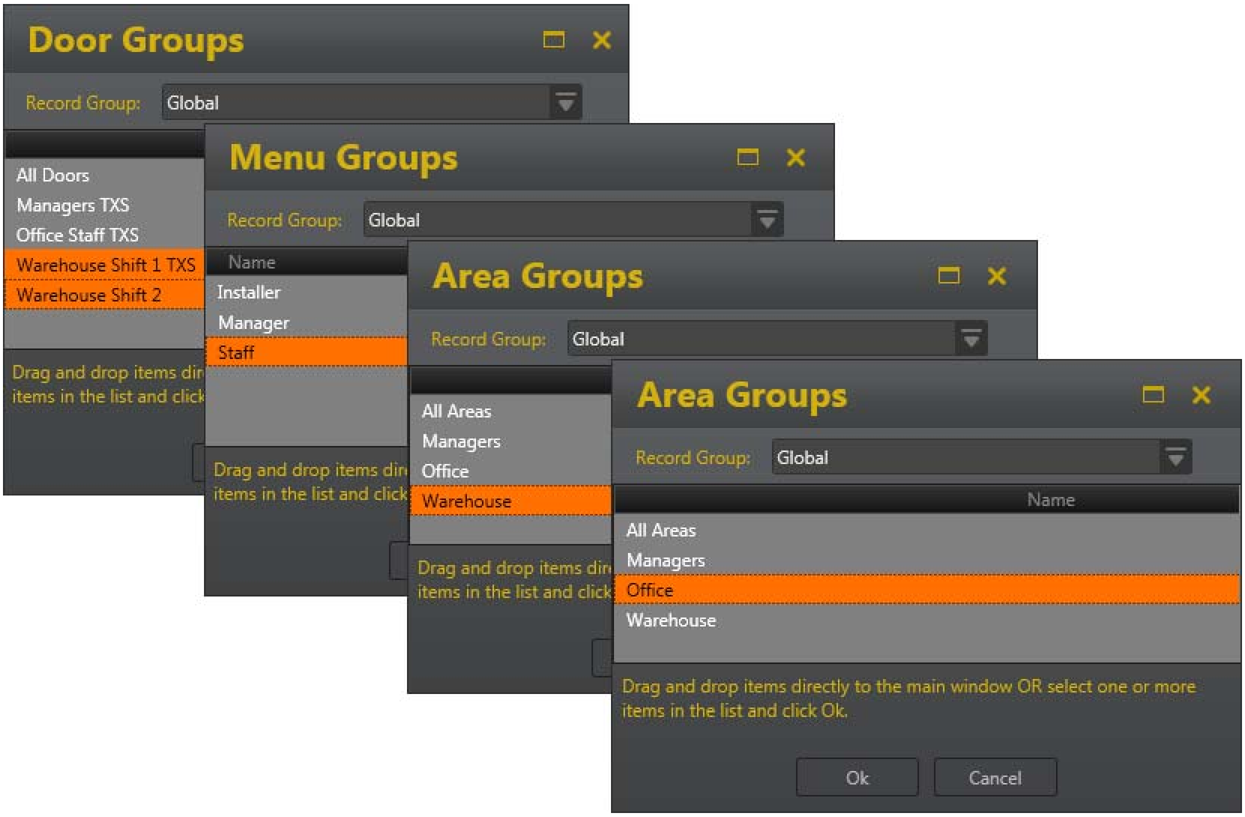
Configure the Warehouse Shift 2 Access Level

1. Select the **Warehouse Shift 2** access level
2. Add the **Warehouse Shift 2** door group



Configure the Warehouse Supervisor Access Level

1. Select the **Warehouse Supervisor** access level



2. Add the **Warehouse Shift 1** and **Warehouse Shift 2** door groups
3. Add the **Staff** menu group
4. Add the **Warehouse** area to the Disarming Area Groups tab
5. Add the **Office** area to the Arming Area Groups tab

Assign the Remaining Cards

- Assign card number 4 to Lois Joseph
- Assign card number 5 to Douglas Ross
- Assign card number 6 to Gretchen Holmes

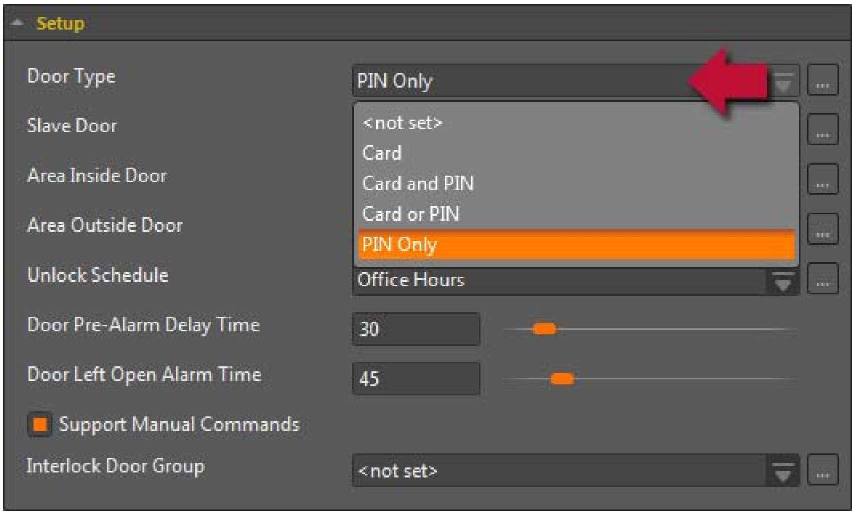
Door Configuration

Door Types

Door Types define how a door will operate. This includes the passback mode, the reading mode used to gain access (such as Card, PIN, Card or PIN, Card and PIN, etc), and if operator verification is required to grant access.

Setting a Door Type

1. Navigate to Programming | Doors
2. Set the Door Type of the Office Entry door to PIN Only



Setup

Door Type: PIN Only

Slave Door

Area Inside Door

Area Outside Door

Unlock Schedule: Office Hours

Door Pre-Alarm Delay Time: 30

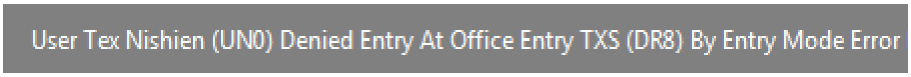
Door Left Open Alarm Time: 45

☑ Support Manual Commands

Interlock Door Group: <not set>

3. Wait for the configuration to download, then try badging Card 1

   You should see a Denied Entry by Entry Mode Error event



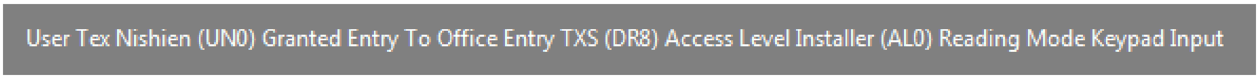
```
User Tex Nishien (UN0) Denied Entry At Office Entry TXS (DR8) By Entry Mode Error
```

   This tells us that the user was trying to gain access to the door using a different credential to what is set in the door type

Testing the Door Type

1. Type in the installer PIN 000000, then press [Enter] on the MultiProx Reader

   This time you should be granted access, with the mode logged as Keypad Input

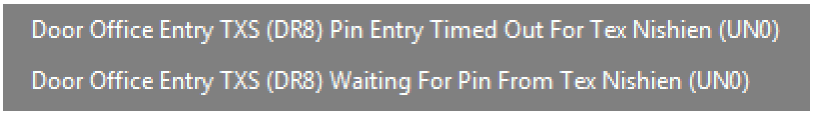


```
User Tex Nishien (UN0) Granted Entry To Office Entry TXS (DR8) Access Level Installer (AL0) Reading Mode Keypad Input
```

2. Now set the Door Type of the Office Entry door to Card and PIN

   Wait for the configuration to download, then try badging the card. Do not enter a PIN.

After approximately 10 seconds, you will see a PIN Entry Timed Out event.

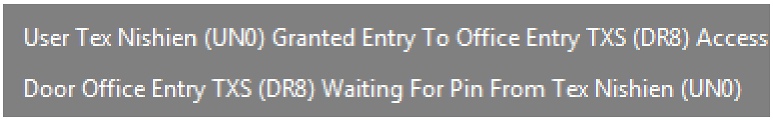


Door Office Entry TXS (DR8) Pin Entry Timed Out For Tex Nishien (UN0)

Door Office Entry TXS (DR8) Waiting For Pin From Tex Nishien (UN0)

3. Badge the card then type **000000** and press **[Enter]** at the MultiProx reader

   This time you should be granted access.

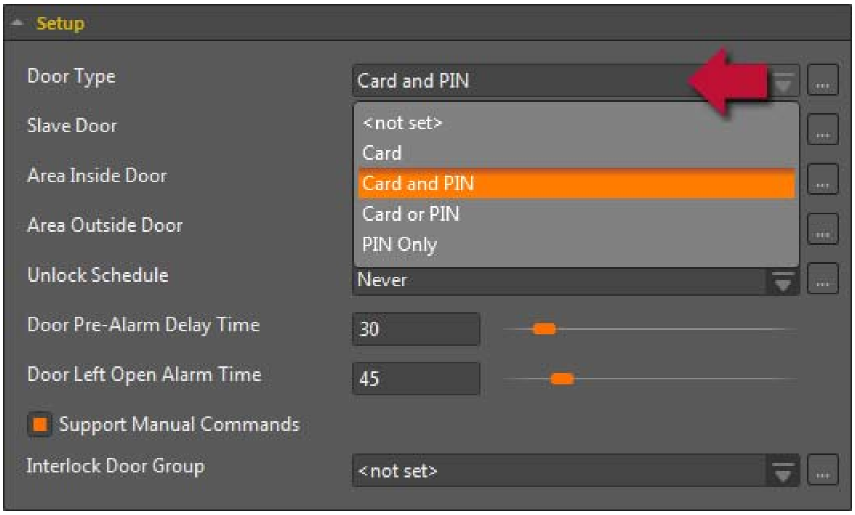


User Tex Nishien (UN0) Granted Entry To Office Entry TXS (DR8) Access

Door Office Entry TXS (DR8) Waiting For Pin From Tex Nishien (UN0)

Setting Additional Door Types

Set the **Door Type** of the **Warehouse Roller** door to **Card and PIN**:



Setup

Door Type: Card and PIN

Slave Door

Area Inside Door

Area Outside Door

Unlock Schedule: Never

Door Pre-Alarm Delay Time: 30

Door Left Open Alarm Time: 45

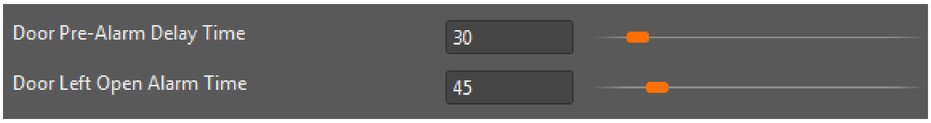
■ Support Manual Commands

Interlock Door Group: <not set>

We'll leave the **Managers Office** and **Office to Warehouse** doors as **Card Only** door types

DOTL Times

We configure the Pre-Alarm Delay and Door Left Open Alarm (DOTL) times under the Door's **General** tab:



Door Pre-Alarm Delay Time: 30

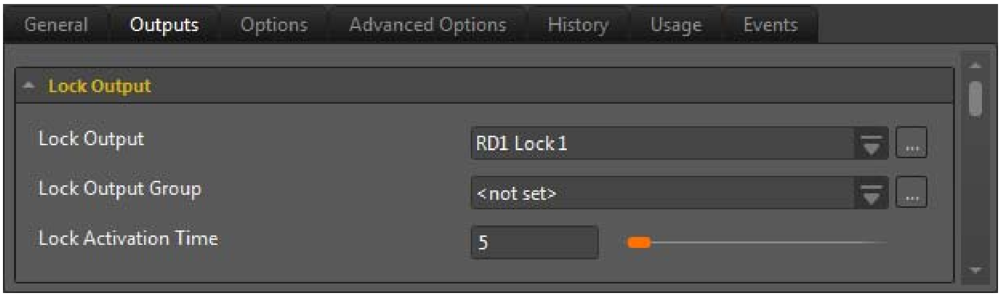
Door Left Open Alarm Time: 45

- The **Door Pre-Alarm Delay Time** defines how long a door can be propped open before a **warning** is triggered
- The **Door Left Open Alarm Time** defines how long a door can be propped open before an **alarm** is generated

Both times are measured from the time the door is **opened**

Door Outputs

We configure the outputs under the Door's **Outputs** tab:



Lock Output

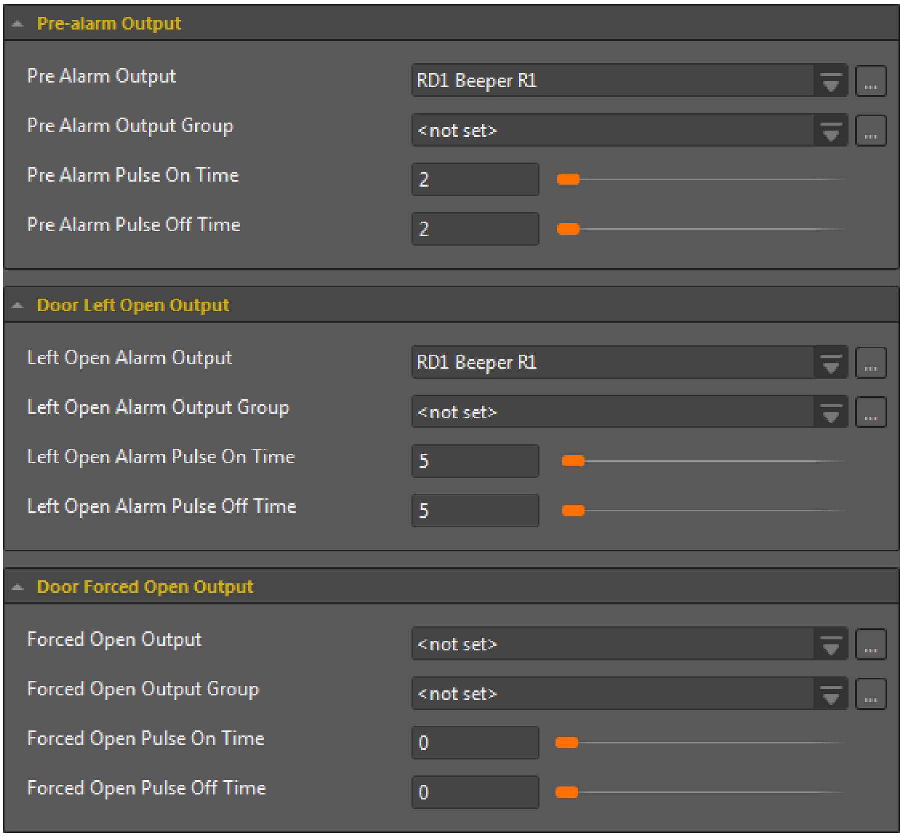
Lock Output	RD1 Lock 1
Lock Output Group	<not set>
Lock Activation Time	5

- The **Lock Output** and **Lock Output Group** determine which output or output group to **activate** when the door unlocks
- The **Lock Activation Time** defines **how long** the door unlocks for (in seconds)

Note that the Add Controller Wizard has configured this automatically.

The **Outputs** tab is also where we configure outputs or output groups for:

- Door Pre-Alarm
- Door Left Open Alarm
- Door Forced Open



Pre-alarm Output

Pre Alarm Output	RD1 Beeper R1
Pre Alarm Output Group	<not set>
Pre Alarm Pulse On Time	2
Pre Alarm Pulse Off Time	2

Door Left Open Output

Left Open Alarm Output	RD1 Beeper R1
Left Open Alarm Output Group	<not set>
Left Open Alarm Pulse On Time	5
Left Open Alarm Pulse Off Time	5

Door Forced Open Output

Forced Open Output	<not set>
Forced Open Output Group	<not set>
Forced Open Pulse On Time	0
Forced Open Pulse Off Time	0

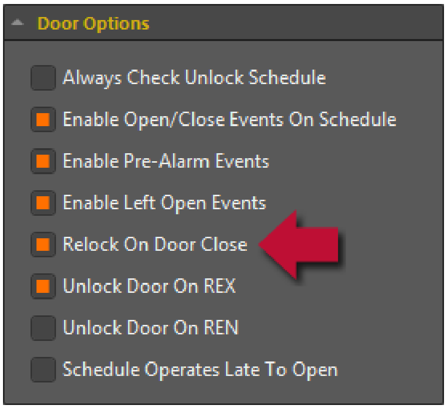
These can be set to pulse in the same way we configured our area outputs.

By default, the Pre-Alarm and Left Open Alarm are configured to pulse the local reader beeper at different rates. The Door Forced Open is not configured by default.

Relock on Door Close

1. Badge Card 2 at the Managers Door reader
2. Open the **Managers Dr (Door) TXS CP1:5** input
3. Close the **Managers Dr (Door) TXS CP1:5** input

   Notice that the lock output remains on for 5 seconds regardless of how long the door opens for
4. Select the **Managers Office** door and go to the **Options** tab
5. Enable the **Relock on Door Close** option and save your changes



Door Options

□ Always Check Unlock Schedule
☑ Enable Open/Close Events On Schedule
☑ Enable Pre-Alarm Events
☑ Enable Left Open Events
☑ Relock On Door Close
☑ Unlock Door On REX
□ Unlock Door On REN
□ Schedule Operates Late To Open

6. Wait a few seconds then try simulating entering the Managers Office again

Notice that the door now locks as soon as it closes.

Door Options

There are many more door options that can be configured however these are outside of the scope of this certification.

Reader Expander Configuration

While some functionality is configured at the door, many options around door processing is carried out at the **Reader Expander**.

1. Navigate to **Expanders | Reader Expanders**

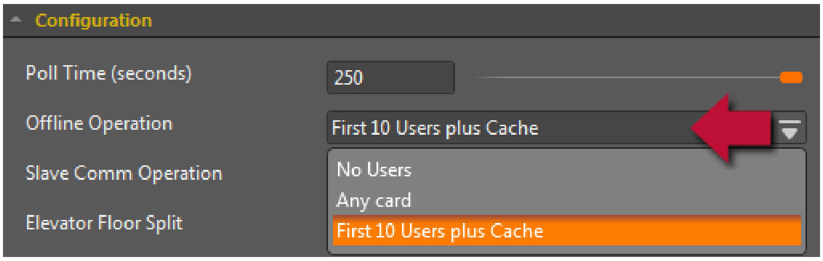
   You'll see that the Add Controller Wizard has automatically created both Reader Expanders
2. Name the Reader Expanders using our naming conventions:
   - RD1 = **Office Entry | Managers Office RD1 TXS**
   - RD2 = **Warehouse Roller | Office to Warehouse RD2 TXS**

   This way, we can use the find tool to find a particular door, module, or site.

Offline Operation

Offline Operation defines how a reader expander will behave if it loses communications with the controller

- RD1 has been configured as the controller onboard reader expander, so offline operation is not relevant for RD1
- RD2 controls access to the warehouse, so let's set the offline operation to **First 10 Users plus Cache**



Configuration

Poll Time (seconds): 250

Offline Operation: First 10 Users plus Cache

- No Users
- Any card
- First 10 Users plus Cache

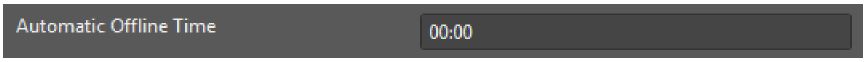
Slave Comm Operation

Elevator Floor Split

For offline operation to work, we also need to configure some options at the controller...

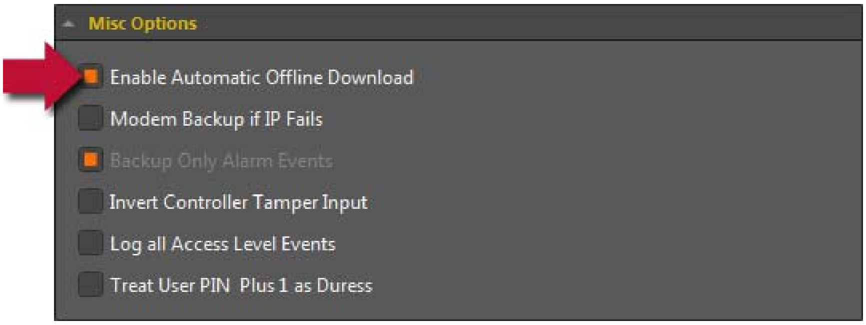
1. Navigate to **Sites | Controllers** and select the **Configuration** tab

   The **Automatic Offline Time** defines the time of day that the Controller will download offline users to the expanders and is set to midnight by default



Automatic Offline Time: 00:00

2. Go to the **Options** tab and select (enable) the **Enable Automatic Offline Download** option:



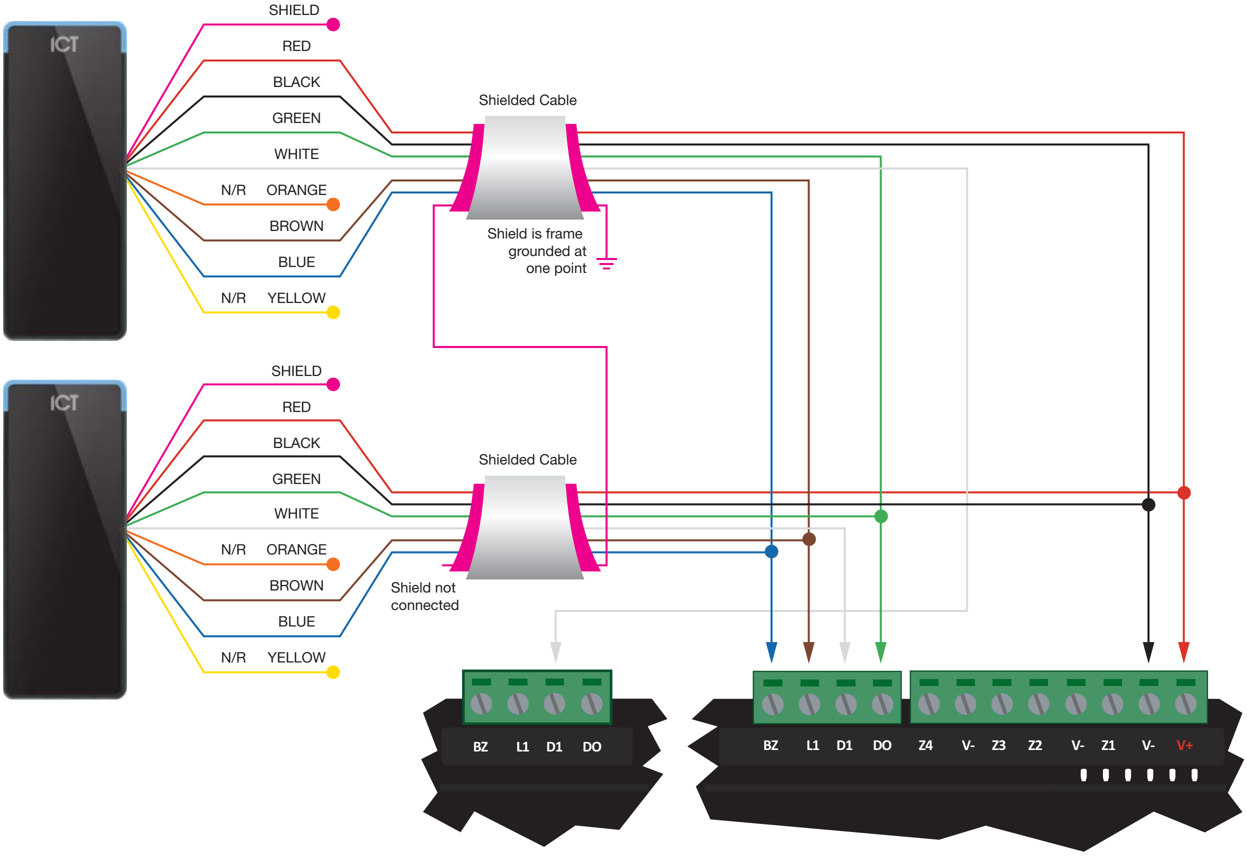
Misc Options

- ☑ Enable Automatic Offline Download
- □ Modem Backup if IP Fails
- ☑ Backup Only Alarm Events
- □ Invert Controller Tamper Input
- □ Log all Access Level Events
- □ Treat User PIN Plus 1 as Duress

3. Save your changes

Reader Multiplexing

A unique feature of Protege GX is the ability to configure both an entry and an exit reader while only using a single reader port

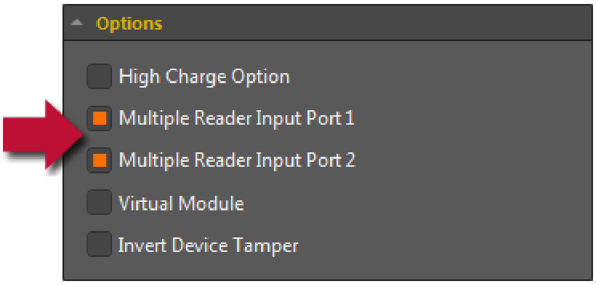


Our system design is using this feature for the Warehouse Roller and Office to Warehouse doors.

1. Navigate to **Expanders | Reader Expanders** and select RD2
2. Select (enable) **Multiple Reader Input Port 1**

   This will enable multiplexing for the Warehouse Roller door
3. Select (enable) **Multiple Reader Input Port 2**

   This will enable multiplexing for the Office to Warehouse door



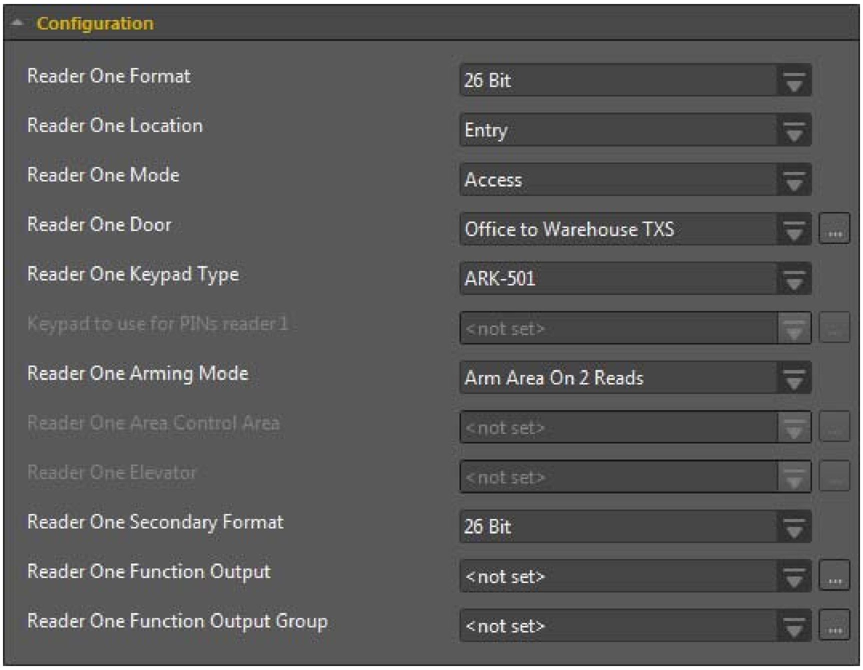
Options

□ High Charge Option
☑ Multiple Reader Input Port 1
☑ Multiple Reader Input Port 2
□ Virtual Module
□ Invert Device Tamper

4. Save the changes.

Reader Configuration

Select the **Reader One** tab. The **Configuration** options here define the behavior of the reader port 1.



Configuration

Reader One Format	26 Bit
Reader One Location	Entry
Reader One Mode	Access
Reader One Door	Office to Warehouse TXS
Reader One Keypad Type	ARK-501
Keypad to use for PINs reader 1	<not set>
Reader One Arming Mode	Arm Area On 2 Reads
Reader One Area Control Area	<not set>
Reader One Elevator	<not set>
Reader One Secondary Format	26 Bit
Reader One Function Output	<not set>
Reader One Function Output Group	<not set>

By default, readers are configured for:

- 26 bit reading mode
- As entry readers for access control
- ARK-501 keypad (supports the ICT Multi Prox PIN input)

The Add Controller Wizard has automatically assigned each reader port to a door: RD1 to doors 1 and 2, RD2 to doors 3 and 4, and so on.

Reader Options

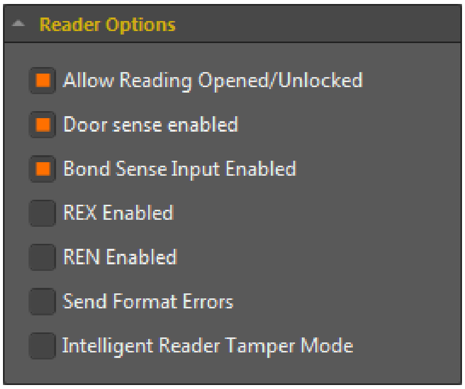
The **Reader Options** are where we configure which of the Reader Expander inputs will be associated with door processing. We have used door sense (reed switches) for all of our doors, so will leave the **Door sense enabled** option selected.

1. Select (enable) the **Bond Sense Input Enabled** for both Reader One and Reader Two on RD1, and for Reader Two on RD2

   This will enable bond sense on all doors except the Warehouse Roller

2. Clear (disable) the **REX Enabled** option for Reader One and Reader Two on RD2

   Both the Warehouse Roller and Office to Warehouse door have entry and exit readers and will not be using a REX input.



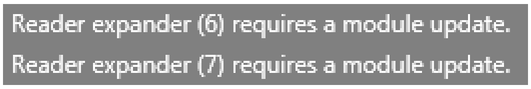
Reader Options

- ☑ Allow Reading Opened/Unlocked
- ☑ Door sense enabled
- ☑ Bond Sense Input Enabled
- ☐ REX Enabled
- ☐ REN Enabled
- ☐ Send Format Errors
- ☐ Intelligent Reader Tamper Mode

Review the Health Status

The Status Bar should now be showing 2 health status warnings.

1. Navigate to Sites | Controllers and open the Controller Health Status window.



Reader expander (6) requires a module update.
Reader expander (7) requires a module update.

Remember, the numbers inside the brackets refer to the Database ID, not the physical expander number.

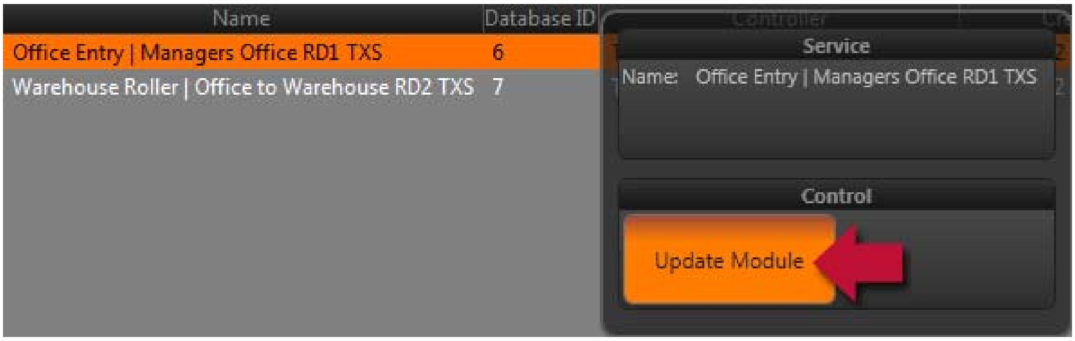
2. Both reader expanders require a module update as we have made changes to the physical properties of the hardware (disabled and enabled inputs for door processing).

Performing a Module Update

1. Navigate to Expanders | Reader Expanders

   Note the Database ID's match the health status warning. Your Database IDs will probably be different from the IDs shown here.

2. Right click on RD1 and select Update Module



Name	Database ID
Office Entry | Managers Office RD1 TXS	6
Warehouse Roller | Office to Warehouse RD2 TXS	7

Service

Name: Office Entry | Managers Office RD1 TXS

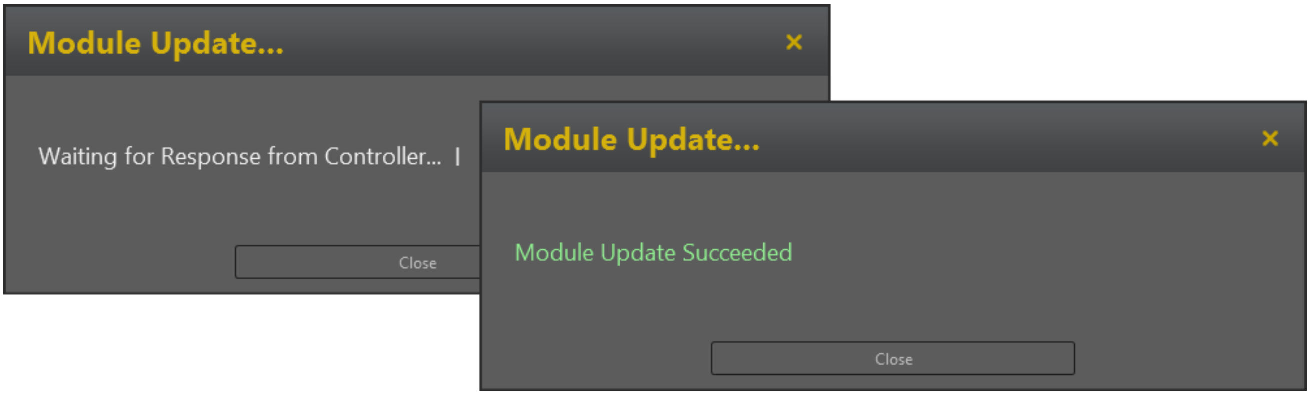
3. Repeat to perform a module update on RD2.

Once complete, the health status should return to ok.

Module Updates

During a module update, there is a short period (a few seconds) where the expander temporarily stops processing

- Performing an update from the Controller will update **all modules** connected to the system
- Performing an update from the selected module only updates that **single module** causing less disruption
- Additionally, a single module update provides a confirmation that the update succeeded and the new configuration is now running



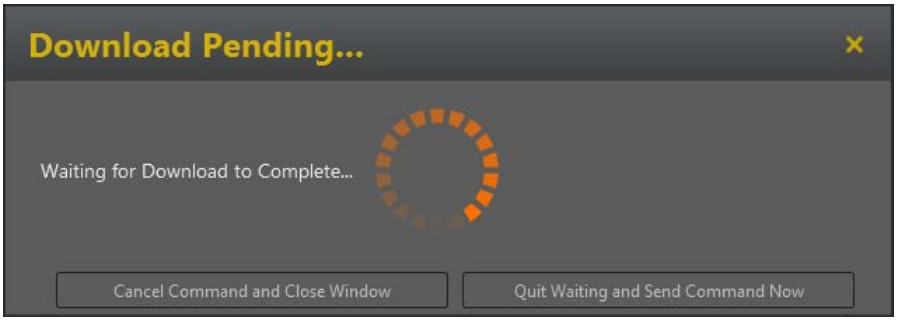
Waiting for Response from Controller...

Module Update Succeeded

Downloading Changes Before Updating

It is important that any configuration changes are downloaded to the Controller **before** a module update is performed.

If you attempt to update a module that has a download pending, the software will prompt you to initiate the download first. Click OK to force the download.



Waiting for Download to Complete...

Download Pending...
Cancel Command and Close Window
Quit Waiting and Send Command Now

Once the download is complete, the module update is actioned.

Review Questions

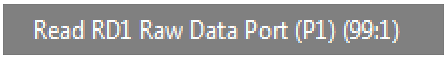
If a door has been created by the Add Controller Wizard with no additional configuration and it is the Forced Open state, which input must be open?

- □ The REN (Request to Enter) Input
- □ The REX (Request to Exit) Input
- □ The Bond Sense (Lock State) Input
- □ The Door Sense (Reed) Input

Which inputs are configured by default as bond sense (lock state) inputs on a Reader Expander?

- □ 1 and 5
- □ 2 and 6
- □ 3 and 7
- □ 4 and 8

What does this event mean?



Read RD1 Raw Data Port (P1) (99:1)

- □ A card has been read that was programmed incorrectly at the factory
- □ The Reader Expander has the wrong format programmed
- □ A new card has been assigned to a user
- □ An unknown card has been read on Port 1

If a new area is created but is not added to any area groups, who will be able to disarm it?

- □ Nobody
- □ The Installer
- □ The Manager
- □ Anyone with the 'All Areas' disarming area group

If a new door is created but is not added to any door groups or access levels, who will have access to it?

- □ The Installer
- □ Anyone with the 'All Doors' door group
- □ Nobody
- □ The Manager

If a user is automatically logged out of a keypad after a period of time, which option do they NOT have checked in their menu group?

- □ Installer (4)
- □ Advanced Installer (4, 8)
- □ Installer Menu Group
- □ Time (6)

What do Door Types do?

- □ They define which lock outputs to use
- □ They set double badge arming
- □ They define the reading mode used to gain access
- □ All of the above

For Offline Operation on a Reader Expander to allow a cached user through a door in offline mode, what items must be configured?

- □ The Controller must have the Enable Automatic Offline Download option checked and the Reader Expander offline operation mode must be set to First 10 Users + Cache
- □ The Reader must be programmed for Intelligent offline mode and the user must have the Super Rights option checked
- □ The Reader must be programmed for Intelligent offline mode and the Reader Expander offline operation mode must be set to First 10 Users + Cache
- □ The Controller must have the Enable Automatic Offline Download option checked and the user must have the Super Rights option checked

Two Readers are going to be wired to Port 1 of a Reader Expander. To configure multiplexing, what must be done?

- □ The exit reader must have D0 wired to reader port 2 and Multiple Reader Input Port 1 must be checked
- □ The exit reader must have D0 wired to reader port 2 and Multiple Reader Input Port 2 must be checked
- □ The exit reader must have D1 wired to reader port 2 and Multiple Reader Input Port 1 must be checked
- □ The exit reader must have D1 wired to reader port 2 and Multiple Reader Input Port 2 must be checked

Module 135: Configuring Intruder and Access Integration

In this module we'll finish configuring intruder detection and access control according to the system requirements we defined earlier.

In This Module

Configuring Office Access

From the Protege GX user interface:

- Set the Controller time to 7am on a weekday
- Arm the Office area (if it isn't already armed)
- Lock the Office Entry door (if it isn't already locked)

Now we're going to simulate the manager arriving in the morning:

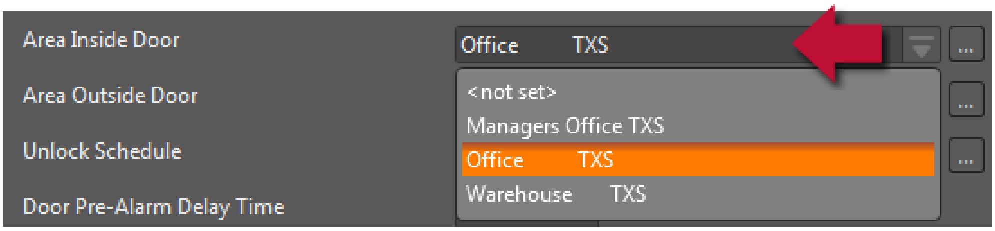
- Badge Card 2 at the Office Entry reader and enter the PIN 9998
- Open the Office Entry Dr (Door) TXS CP1:1 input to simulate opening the door
- Note the keypad starts entry delay

Door Areas

It makes sense that if a staff member is allowed access, the area should be turned off automatically for them. We'll do this now...

The first step to configure this is to assign the area to the door:

- Navigate to Programming | Doors
- Select the Office Entry door and go to the General tab
- Set the Area Inside Door to the Office area



Area Inside Door: Office TXS

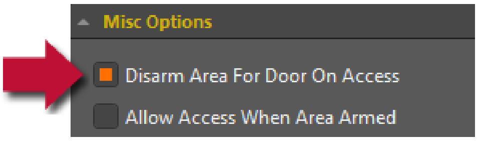
Area Outside Door

Unlock Schedule

Door Pre-Alarm Delay Time

Disarm On Entry

- Navigate to Expanders | Reader Expanders and select RD1
- Go to the Reader 1 tab and select (enable) the Disarm Area For Door On Access option



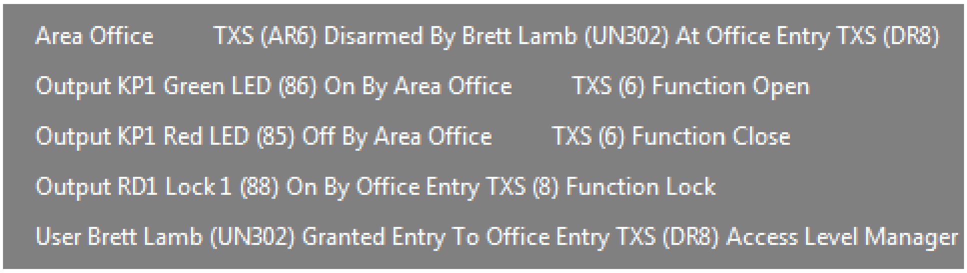
Misc Options

☑ Disarm Area For Door On Access

□ Allow Access When Area Armed

- Save the changes

- Wait a few seconds then badge Card 2 again. Enter the PIN 9998.



Area Office TXS (AR6) Disarmed By Brett Lamb (UN302) At Office Entry TXS (DR8)

Output KP1 Green LED (86) On By Area Office TXS (6) Function Open

Output KP1 Red LED (85) Off By Area Office TXS (6) Function Close

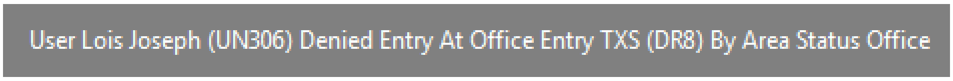
Output RD1 Lock 1 (88) On By Office Entry TXS (8) Function Lock

User Brett Lamb (UN302) Granted Entry To Office Entry TXS (DR8) Access Level Manager

This time the Office area will automatically disarm.

- Arm the Office area again
- Badge Card 4 at the Office Entry reader and enter PIN 2758

Our user Lois Joseph has the Warehouse Shift 1 access level. This has the Office Entry door in a door group and the schedule is valid, however because Lois doesn't have access to the Office area, she is denied access.



User Lois Joseph (UN306) Denied Entry At Office Entry TXS (DR8) By Area Status Office

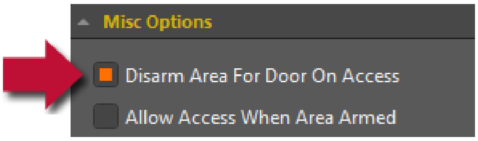
- Badge Card 2 at the Office Entry reader and enter PIN 9998.
- Badge Card 4 at the Office Entry reader and enter PIN 2758

You'll see that Lois Joseph is now granted access as the Office area is no longer armed.

This fulfills our system design requirement that the warehouse staff will only have access to the office area when the office staff are present.

We want to set this functionality up for all of our doors. Select (enable) the Disarm Area For Door On Access option on:

- the Reader 2 tab of RD1
- the Reader 1 tab of RD2
- the Reader 2 tab of RD2



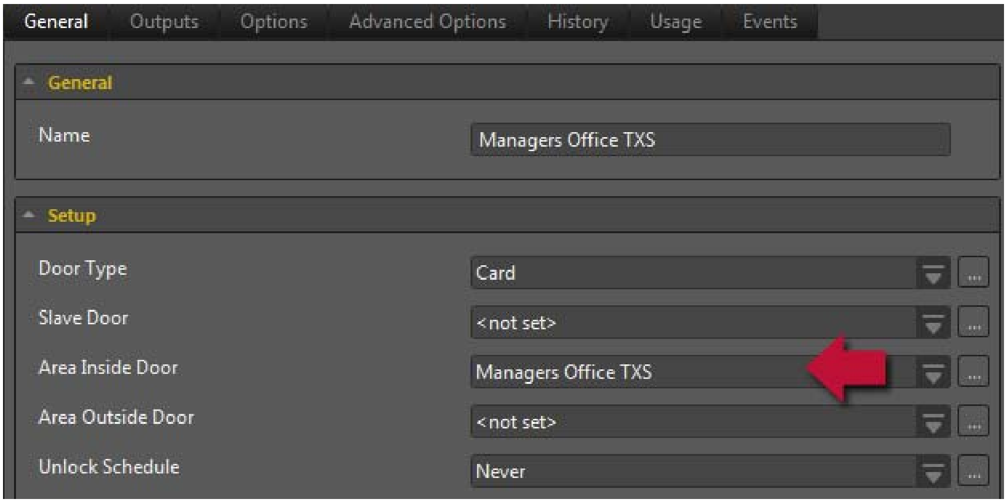
Misc Options

☑ Disarm Area For Door On Access

☐ Allow Access When Area Armed

Disarm on Entry: Manager's Office

- Set the Area Inside Door of the Managers Office door to Managers Office



General

Name: Managers Office TXS

Setup

Door Type: Card

Slave Door: <not set>

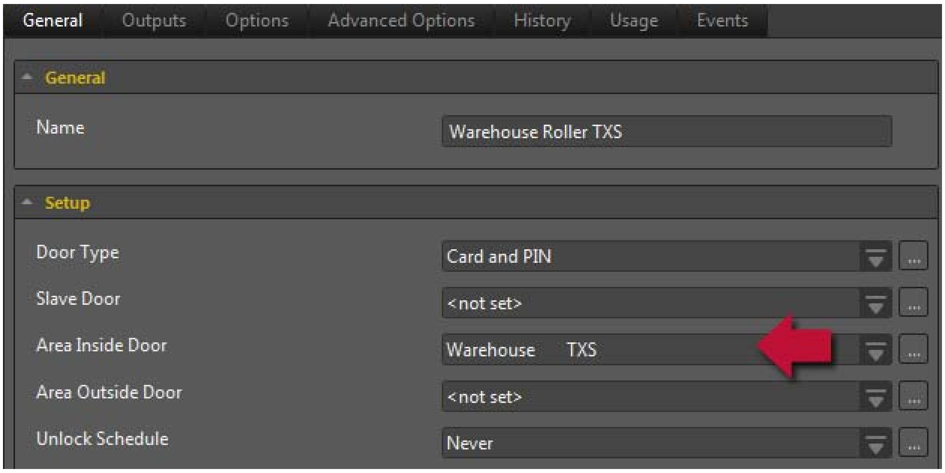
Area Inside Door: Managers Office TXS

Area Outside Door: <not set>

Unlock Schedule: Never

Disarm on Entry: Warehouse Roller

- Set the **Area Inside Door** of the Warehouse Roller door to **Warehouse**



General

Name: Warehouse Roller TXS

Setup

Door Type: Card and PIN

Slave Door: <not set>

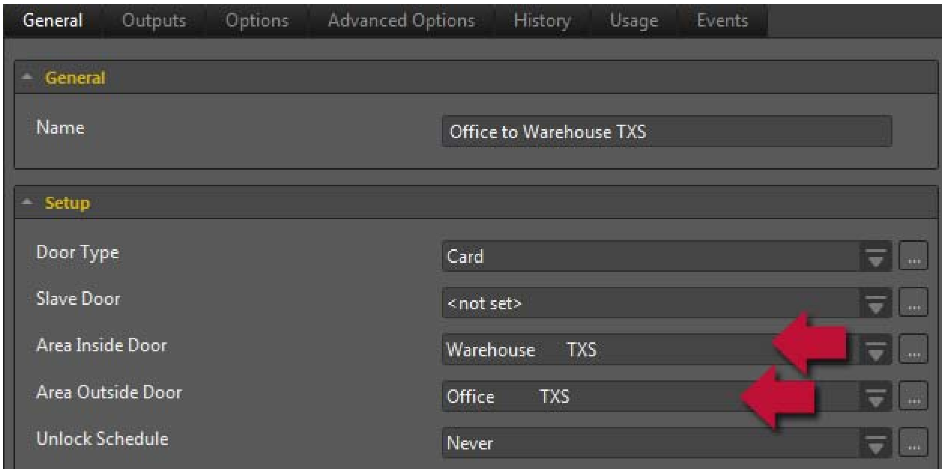
Area Inside Door: Warehouse TXS

Area Outside Door: <not set>

Unlock Schedule: Never

Disarm on Entry: Office to Warehouse Door

- Set the **Area Inside Door** of the Office to Warehouse door to **Warehouse**
- Set the **Area Outside Door** of the Office to Warehouse door to **Office**



General

Name: Office to Warehouse TXS

Setup

Door Type: Card

Slave Door: <not set>

Area Inside Door: Warehouse TXS

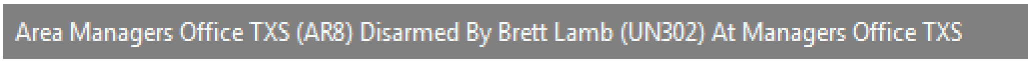
Area Outside Door: Office TXS

Unlock Schedule: Never

Arming an Area on 2 Reads

- Badge **Card 2** at the Managers Office door

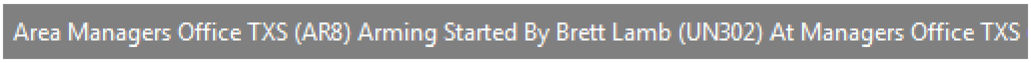
  The Area is disarmed



Area Managers Office TXS (AR8) Disarmed By Brett Lamb (UN302) At Managers Office TXS

- Now badge **Card 2** at the Managers Office door **twice** in a row

  You should get a 3 beep acknowledgment, and the Managers Office starts to arm again



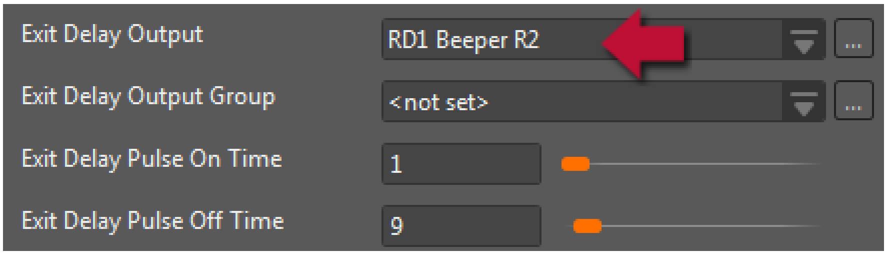
Area Managers Office TXS (AR8) Arming Started By Brett Lamb (UN302) At Managers Office TXS

This is because the Reader Expander is configured by default to **Arm Area on 2 Reads**

Configure the Managers Office Outputs

We don't have a keypad to show the status of the managers office, but we do have a reader, so let's set some outputs for the Managers area:

- Navigate to **Programming | Areas**
- Select the **Managers Office** area and go to the Outputs tab
- Set the **Exit Delay Output** to **RD1 Beeper R2**



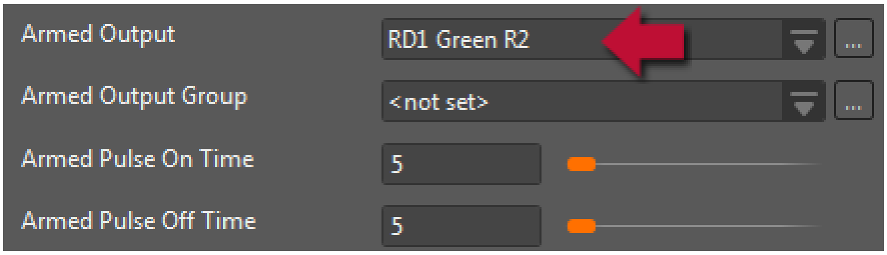
Exit Delay Output: RD1 Beeper R2

Exit Delay Output Group: <not set>

Exit Delay Pulse On Time: 1

Exit Delay Pulse Off Time: 9

- Set Pulse Times of **1** and **9**
- Set the **Armed Output** to **RD1 Green R2**



Armed Output: RD1 Green R2

Armed Output Group: <not set>

Armed Pulse On Time: 5

Armed Pulse Off Time: 5

- Set the Pulse Times to **5** and **5**
- Save your changes

The outputs we have used are the second reader port (R2) on reader expander 1 (RD1)

Wait a few seconds, then try double badge arming at the Managers Office reader. The reader should now **beep** during exit delay, then **flash** the LED while armed.

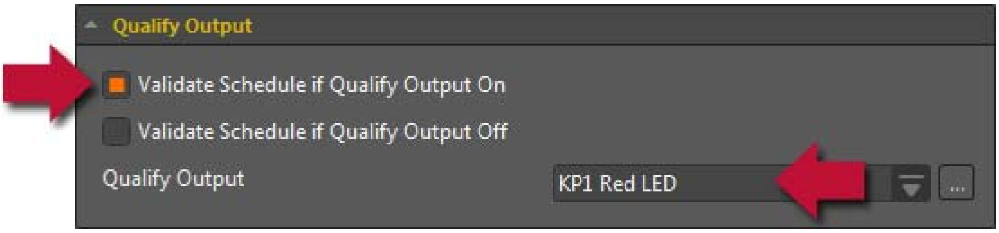
Configure the Office Entry Door

Badge **Card 2** at the Office Entry door twice. Because the door is set for Card and PIN mode, we would have to badge our card **and** enter our PIN twice to get the Arm on 2 Reads function to work

A better approach is to set the door mode to Card and PIN if the alarm is armed, and to Card Only if the alarm is disarmed. To achieve this, we are going to need to create a new schedule that is valid when the Office area is set, then change the door mode when the schedule is invalid...

Create an Area Armed Schedule

- Navigate to **Sites | Schedules**
- Add a new schedule called **Office Area Armed**
- Select all days in period 1 and set the holiday mode to **Ignore Holiday**
- Go to the **Options** tab and select (enable) the **Validate Schedule if Qualify Output On** option
- Set the **Qualify Output** to **KP1 Red LED**



Qualify Output

☑ Validate Schedule if Qualify Output On

□ Validate Schedule if Qualify Output Off

Qualify Output: KP1 Red LED

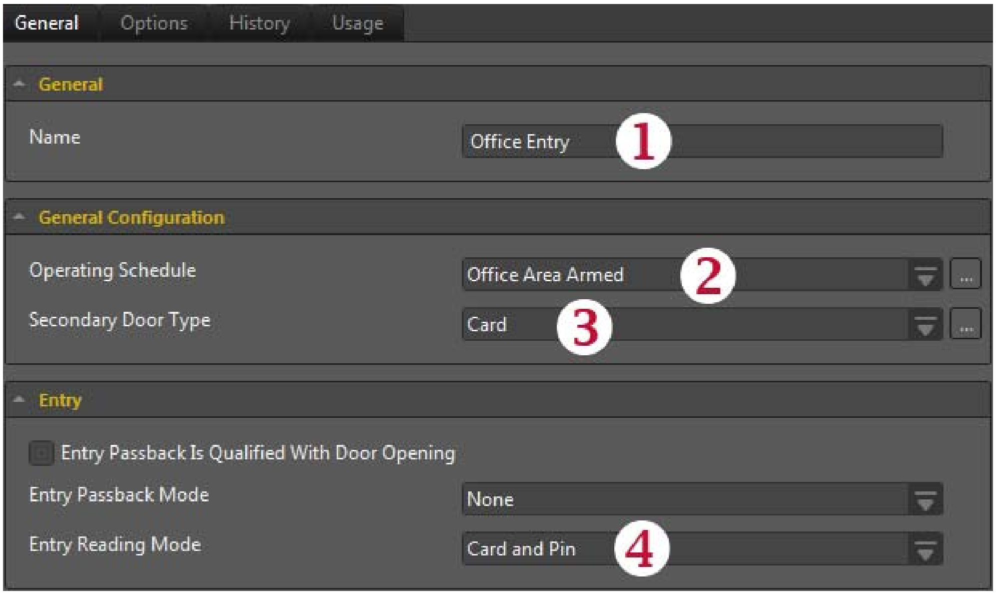
We have created a schedule that will be valid 24/7 regardless of holidays, but requires the keypad's red LED to be ON before the schedule becomes valid. The keypad red LED is turned on when the area is armed.

Create a New Door Type

Now we will need to create a new door type that changes based on the state of the new schedule.

Navigate to **Programming | Door Types:**

1. Add a new door type called **Office Entry**
2. Set the **Operating Schedule** to **Office Area Armed**



General

Name: Office Entry

General Configuration

Operating Schedule: Office Area Armed

Secondary Door Type: Card

Entry

□ Entry Passback Is Qualified With Door Opening

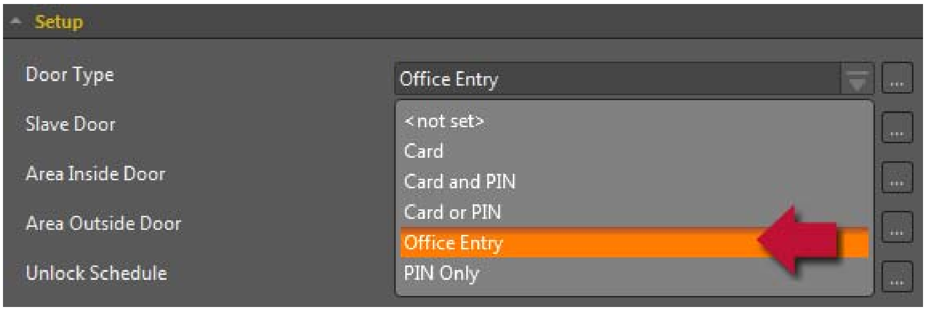
Entry Passback Mode: None

Entry Reading Mode: Card and Pin

3. Set the **Secondary Type** to **Card**
4. Set the **Entry Reading Mode** to **Card and PIN**

Assign the New Door Type

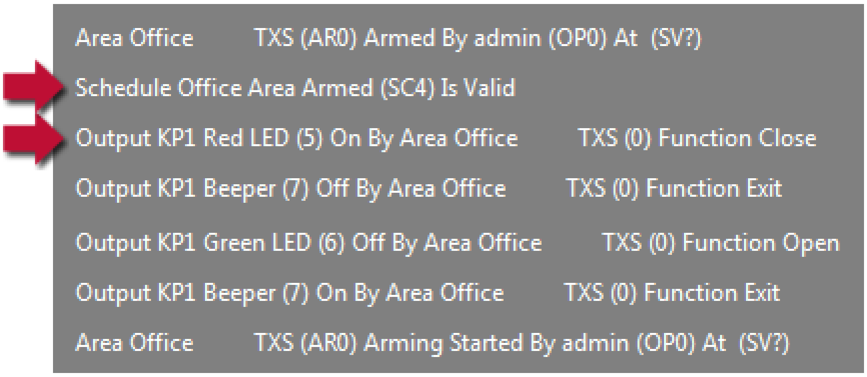
- Navigate to **Programming | Doors**
- Select the **Office Entry** door, and choose the new **Door Type**



Testing the New Door Type

Arm the Office area:

- You will see that as the area is armed, the keypad **Red LED** turns on
- This in turn makes the **Office Area Armed** schedule valid

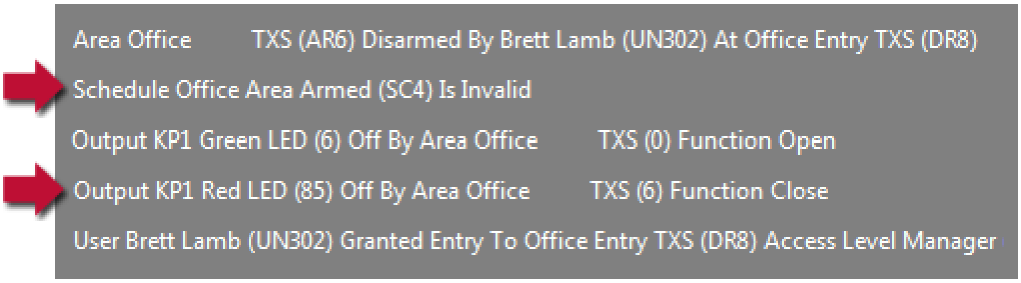


```
Area Office        TXS (AR0) Armed By admin (OP0) At  (SV?)
Schedule Office Area Armed (SC4) Is Valid
Output KP1 Red LED (5) On By Area Office        TXS (0) Function Close
Output KP1 Beeper (7) Off By Area Office        TXS (0) Function Exit
Output KP1 Green LED (6) Off By Area Office        TXS (0) Function Open
Output KP1 Beeper (7) On By Area Office        TXS (0) Function Exit
Area Office        TXS (AR0) Arming Started By admin (OP0) At  (SV?)
```

The door is now in Card and PIN mode

Badge **Card 2** and enter the PIN **9998** at the Office Entry door:

- Brett is granted access which disarms the area
- The keypad **Red LED** turns **off** which makes the schedule invalid



```
Area Office        TXS (AR6) Disarmed By Brett Lamb (UN302) At Office Entry TXS (DR8)
Schedule Office Area Armed (SC4) Is Invalid
Output KP1 Green LED (6) Off By Area Office        TXS (0) Function Open
Output KP1 Red LED (85) Off By Area Office        TXS (6) Function Close
User Brett Lamb (UN302) Granted Entry To Office Entry TXS (DR8) Access Level Manager
```

This puts the door type into its **secondary** type, which is Card only

Door Type Integration Summary

1. We've created a new 24/7 Office Area Armed schedule that is qualified by the Keypad Red LED

   This Schedule becomes valid whenever the Office area is Armed
2. We've created a new Door Type that has the new schedule as its Operating Schedule
3. We've set the Entry Mode to Card and PIN
4. We've set the Secondary Door Type to Card
5. We've assigned the new door type to the Office Entry door

This means that now:

- When the Office area is **armed**, the door type follows its **primary** settings (Card and PIN)
- When the Office area is **disarmed**, the door type switches to its **secondary** type (Card only)

Door Unlocking by Schedule

Earlier, we set the Office Entry door to unlock via the Office Hours schedule. Let's test this functionality:

- Set the Controller time to 4:59pm - at 5:00pm, the door locks.
- Arm the Office area by double badging at the Office Entry reader - the building is locked and secure.

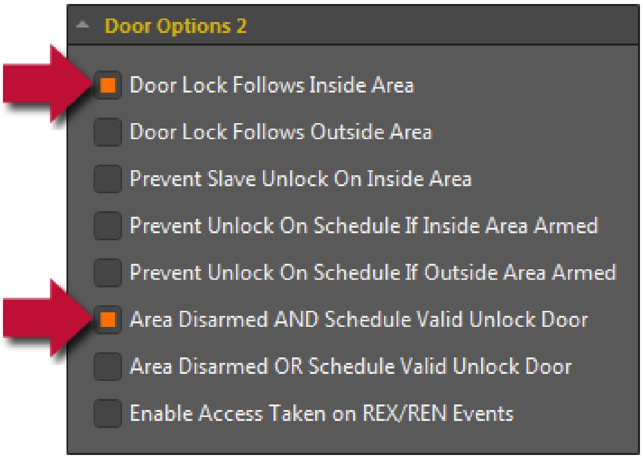
But what happens if nobody turns up for work in the morning?

- Set the Controller time to 8:59am

  At 9:00am, the door unlocks!

We need a way to **prevent** the Office Entry door from unlocking if the Office Area is armed. There are several ways to achieve this, but we'll use the easiest approach:

- Navigate to Programming | Doors
- Select the Office Entry door and go to the Options tab
- Enable the following options:
  - Door Lock Follows Inside Area
  - Area Disarmed AND Schedule Valid Unlock Door



Door Options 2

☑ Door Lock Follows Inside Area
□ Door Lock Follows Outside Area
□ Prevent Slave Unlock On Inside Area
□ Prevent Unlock On Schedule If Inside Area Armed
□ Prevent Unlock On Schedule If Outside Area Armed
☑ Area Disarmed AND Schedule Valid Unlock Door
□ Area Disarmed OR Schedule Valid Unlock Door
□ Enable Access Taken on REX/REN Events

Let's try that test again:

- Disarm the Office Area
- Set the Controller time to **4:59pm** - at 5:00pm, the door locks
- Arm the Office area by double badging at the Office Entry reader - the building is locked and secure
- Set the Controller time to **8:59am**

  At 9:00am, the Office Hours schedule goes valid but this time the door **stays locked**
- Badge **Card 2** and enter the PIN **9998**

  The door is unlocked and the Office area disarmed

  Note the door stays unlocked
- Double badge **Card 2** at the Office Entry reader

  The Area arms and the door locks
- Set the Controller time to **8:58am**
- Badge **Card 2** and enter the PIN **9998**

  Brett is granted access and the area is disarmed, but the door locks again

  At 9:00am the door unlocks

Door Unlocking Integration Summary

1. We've assigned the Office Hours schedule to the Office Entry door as the **Operating Schedule**

   This means that the door will normally unlock when the Office Hours Schedule is valid
2. We assigned the Office Area to the Office Entry door as the **Area Inside Door**
3. We've enabled the **Door Lock Follows Inside Area** option

   This means that the door will normally unlock when the Office area is disarmed
4. We've enabled the **Area Disarmed AND Schedule Valid Unlock Door** option

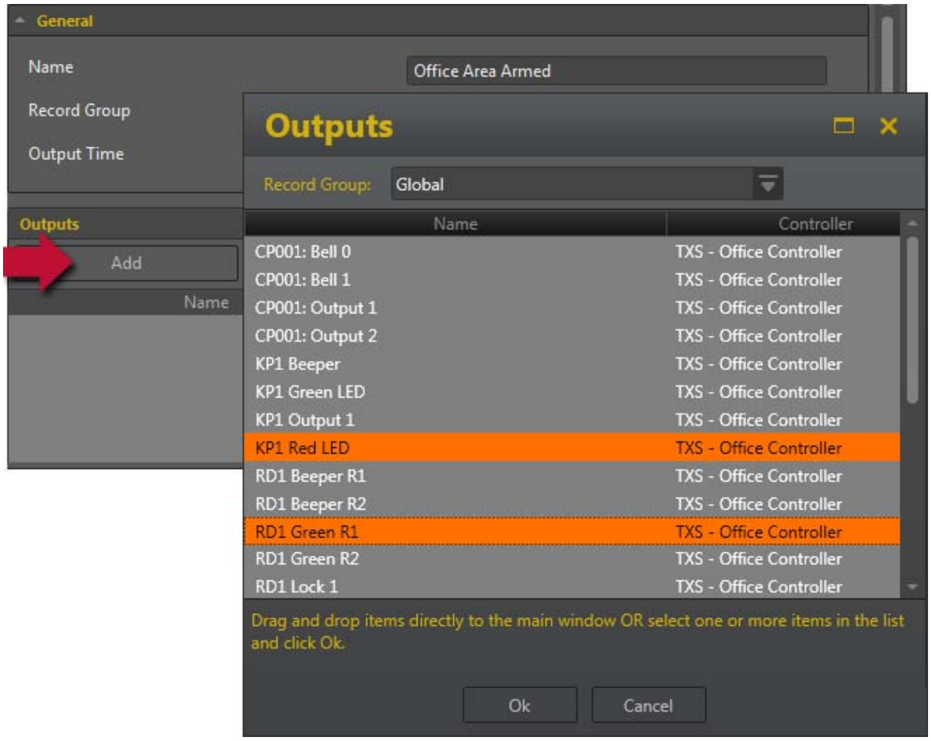
This ties the two together to ensure that the door only unlocks when **both** the Office Hours schedule is valid **and** the Office area is disarmed

Output Groups

Now that we have integrated the access control and intruder functions, it would be good to have some feedback at the reader as well as at the keypad. This can be achieved using **Output Groups.**

Armed Output Group

- Navigate to **Groups | Output Groups**
- Add a new output group called **Office Area Armed**
- Add the **KP1 Red LED** and **RD1 Green R1** outputs



General

Name: Office Area Armed

Record Group

Output Time

Outputs

Add

Name

Outputs

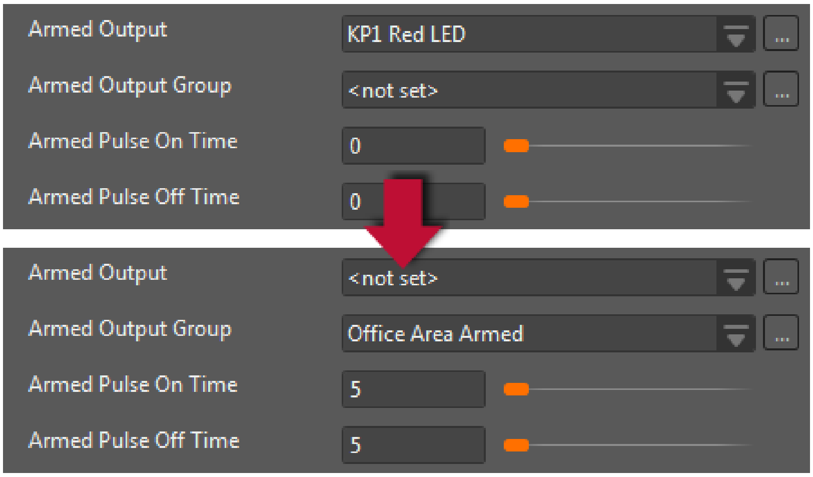
Record Group: Global

Name	Controller
CP001: Bell 0	TXS - Office Controller
CP001: Bell 1	TXS - Office Controller
CP001: Output 1	TXS - Office Controller
CP001: Output 2	TXS - Office Controller
KP1 Beeper	TXS - Office Controller
KP1 Green LED	TXS - Office Controller
KP1 Output 1	TXS - Office Controller
KP1 Red LED	TXS - Office Controller
RD1 Beeper R1	TXS - Office Controller
RD1 Beeper R2	TXS - Office Controller
RD1 Green R1	TXS - Office Controller
RD1 Green R2	TXS - Office Controller
RD1 Lock 1	TXS - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

Ok Cancel

- Navigate to **Programming | Areas** and select the Office area
- Change the **Armed Output** to **<not set>**



Armed Output	KP1 Red LED
Armed Output Group	<not set>
Armed Pulse On Time	0
Armed Pulse Off Time	0

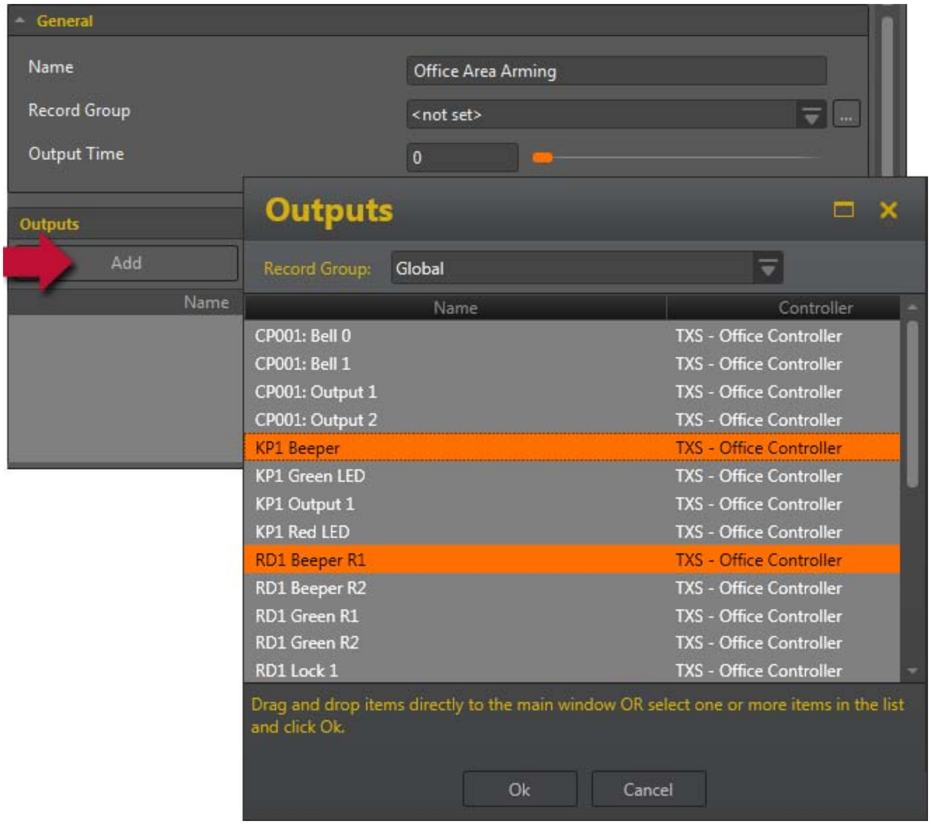
Armed Output	<not set>
Armed Output Group	Office Area Armed
Armed Pulse On Time	5
Armed Pulse Off Time	5

- Set the **Armed Output Group** to the new **Office Area Armed** group
- Set pulse times of **5** and **5**
- Rearm the Office area

Note that even though the outputs are pulsed, the schedule that is following the keypad Red LED only follows the edge triggers.

Arming Output Group

- Navigate to **Groups | Output Groups**
- Add a new output group called **Office Area Arming**
- Add the **KP1 Beeper** and **RD1 Beeper** outputs



General

Name: Office Area Arming

Record Group: <not set>

Output Time: 0

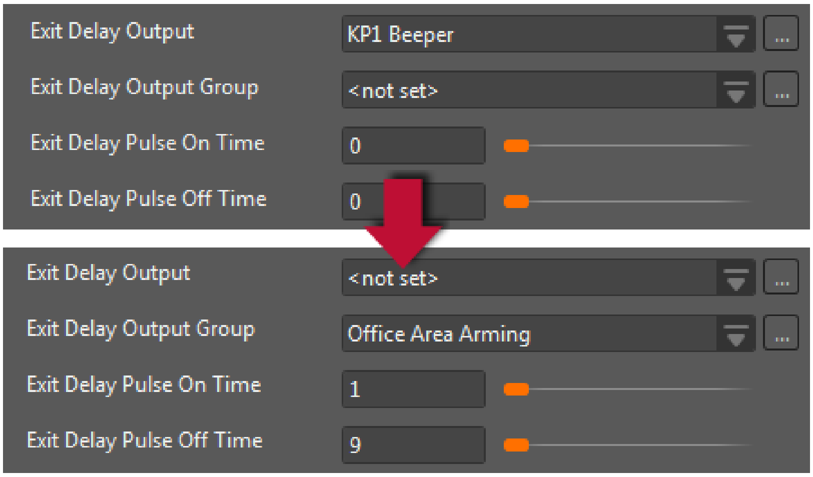
Outputs

Record Group: Global

Name	Controller
CP001: Bell 0	TXS - Office Controller
CP001: Bell 1	TXS - Office Controller
CP001: Output 1	TXS - Office Controller
CP001: Output 2	TXS - Office Controller
KP1 Beeper	TXS - Office Controller
KP1 Green LED	TXS - Office Controller
KP1 Output 1	TXS - Office Controller
KP1 Red LED	TXS - Office Controller
RD1 Beeper R1	TXS - Office Controller
RD1 Beeper R2	TXS - Office Controller
RD1 Green R1	TXS - Office Controller
RD1 Green R2	TXS - Office Controller
RD1 Lock 1	TXS - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

- Navigate to **Programming | Areas** and select the Office area
- Change the **Exit Delay Output** to **<not set>**



Exit Delay Output: KP1 Beeper

Exit Delay Output Group: <not set>

Exit Delay Pulse On Time: 0

Exit Delay Pulse Off Time: 0

Exit Delay Output: <not set>

Exit Delay Output Group: Office Area Arming

Exit Delay Pulse On Time: 1

Exit Delay Pulse Off Time: 9

- Set the **Exit Delay Output Group** to the new **Office Area Arming** group
- Disarm then re-arm the Office area

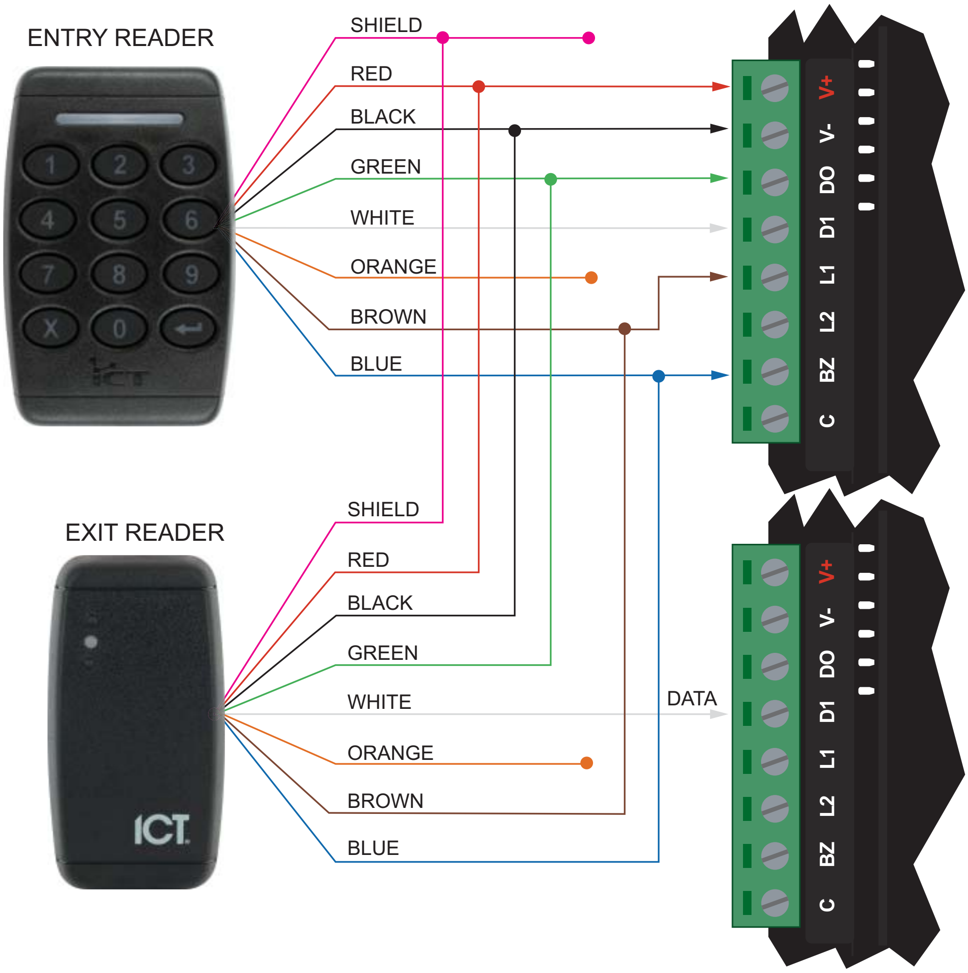
We now have **audible warnings** while arming and **visual indications** at the keypad and reader when armed.

Configuring Warehouse Access

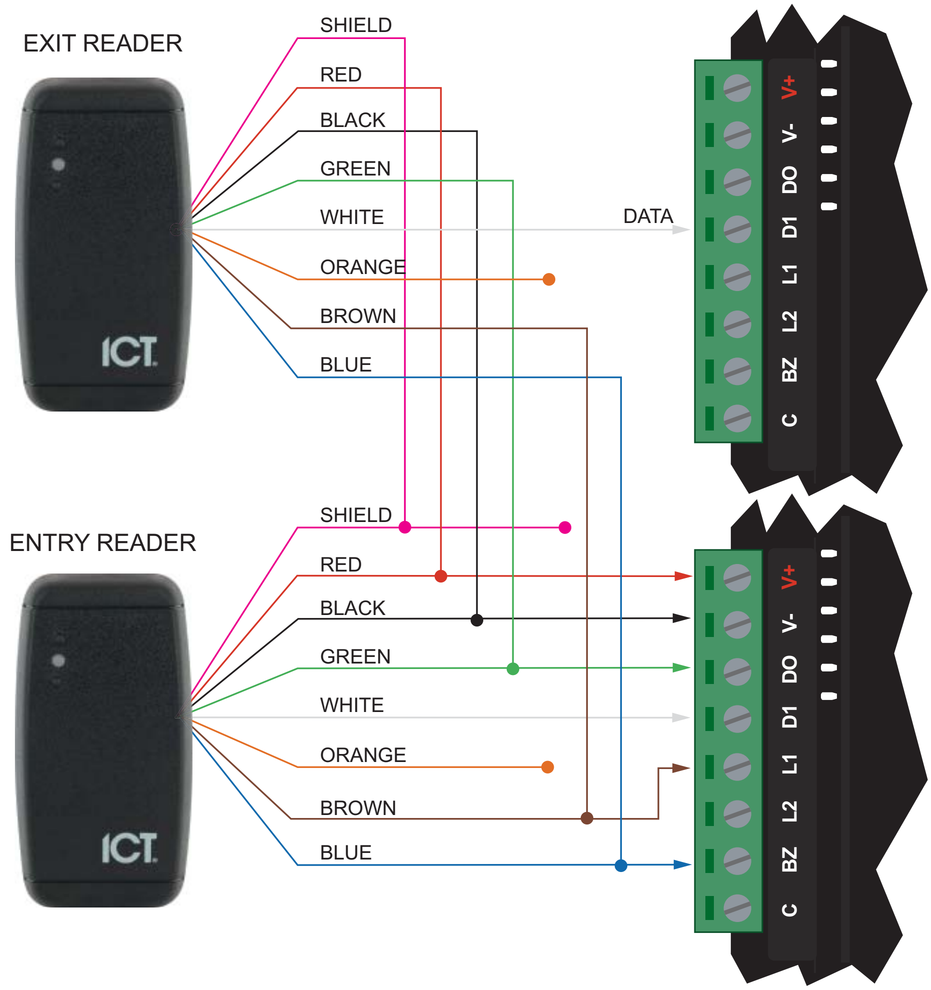
We've fully configured the Office Entry and Managers Office doors and areas, so now let's take a look at the Warehouse...

Door Testing

Wire a Multiprox and a Nano reader in multiplex configuration to Port 1 of the RDM2 expander



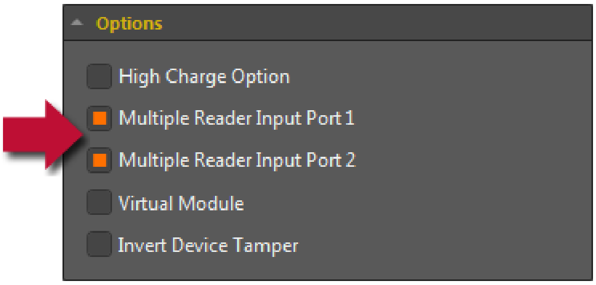
Wire two Nano readers in multiplex configuration to **Port 2** of the RDM2 expander



Reader Multiplex Configuration

We set up reader multiplexing in an earlier module, but let's recap:

- Navigate to **Expanders | Reader Expanders** and select RD2
- Select **Multiple Reader Input Port 1** to enable multiplexing for the **Warehouse Roller**
- Select **Multiple Reader Input Port 2** to enable multiplexing for the **Office to Warehouse Door**



Options

□ High Charge Option
■ Multiple Reader Input Port 1
■ Multiple Reader Input Port 2
□ Virtual Module
□ Invert Device Tamper

- Save your changes

Reader multiplexing makes Protege GX extremely cost effective for doors with more than one reader

Testing the Doors

- Badge Card 2 at the **Warehouse Roller** entry reader

  You will see that an Entry event is generated.

- Badge Card 2 at the **Warehouse Roller** exit reader

  You will see that an Exit event is generated.

- Badge Card 2 at the **Office to Warehouse** entry reader
- Badge Card 2 at the **Office to Warehouse** exit reader

Basic **door configuration** has already been completed...

- Double badge Card 2 at the **Office to Warehouse** exit reader - the Office area should begin to arm
- Double badge Card 2 at the **Office to Warehouse** entry reader - the Warehouse area should begin to arm

Basic **area integration** is also working...

With both areas now armed, you should see that warehouse users are not allowed in the office and that office users are not allowed in the warehouse.

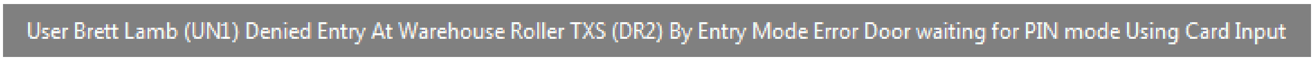
Warehouse Door Type

We have not set the Warehouse Roller door type correctly yet as it needs to be configured for Card and PIN access on the outside...

- Navigate to **Programming | Doors**
- Select the **Warehouse Roller** door
- Set the **Door Type** to **Card and PIN**
- Save your changes
- Wait a few seconds and try badging Card 2 at the Multiprox reader

  Card and PIN mode should now be set.

Badge Card 2 at the Warehouse Roller **exit** reader. You'll see a denied waiting for PIN event:



```
User Brett Lamb (UN1) Denied Entry At Warehouse Roller TXS (DR2) By Entry Mode Error Door waiting for PIN mode Using Card Input
```

This is because our door type has applied Card and PIN to **both** the entry and exit doors. What we actually need is a door type that has Card and PIN on **entry**, and Card on **exit**.

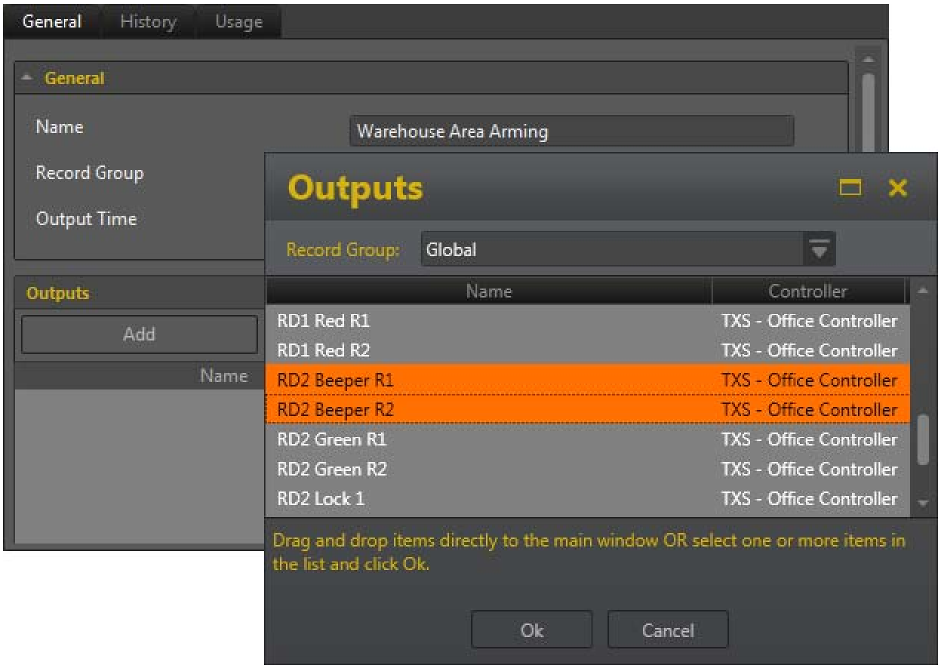
It is good practice to leave the default door and input types unchanged and to create new types if different functionality is required. This means that you have a known reference you can return to if you need to troubleshoot any problems.

Warehouse Area Indication

Because we want to be able to arm the warehouse from the Multiprox reader, we are also going to have to set up a schedule to change the door type when armed. While we are at it, we should set up some indication using reader LED's and beepers.

1. Create a new output group called **Warehouse Area Arming**

   Add outputs **RD2 Beeper R1** and **RD2 Beeper R2**



Name: Warehouse Area Arming

Record Group

Output Time

Outputs

Record Group: Global

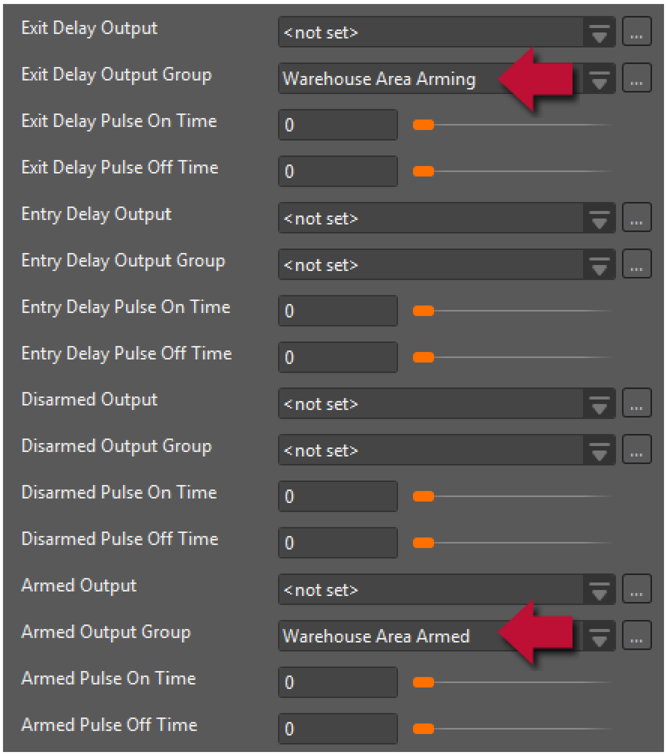
Name	Controller
RD1 Red R1	TXS - Office Controller
RD1 Red R2	TXS - Office Controller
RD2 Beeper R1	TXS - Office Controller
RD2 Beeper R2	TXS - Office Controller
RD2 Green R1	TXS - Office Controller
RD2 Green R2	TXS - Office Controller
RD2 Lock 1	TXS - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

2. Create another output group called **Warehouse Area Armed**

   Add outputs **RD2 Green R1** and **RD2 Green R2**

3. Assign the new groups to the Warehouse area:
   - Navigate to **Programming | Areas** and select the Warehouse area
   - Select the **Outputs** tab
   - Set the **Exit Delay Output Group** to **Warehouse Area Arming**
   - Set the **Armed Output Group** to **Warehouse Area Armed**
4. Save your changes



Exit Delay Output	<not set>
Exit Delay Output Group	Warehouse Area Arming
Exit Delay Pulse On Time	0
Exit Delay Pulse Off Time	0
Entry Delay Output	<not set>
Entry Delay Output Group	<not set>
Entry Delay Pulse On Time	0
Entry Delay Pulse Off Time	0
Disarmed Output	<not set>
Disarmed Output Group	<not set>
Disarmed Pulse On Time	0
Disarmed Pulse Off Time	0
Armed Output	<not set>
Armed Output Group	Warehouse Area Armed
Armed Pulse On Time	0
Armed Pulse Off Time	0

Office Area Indication

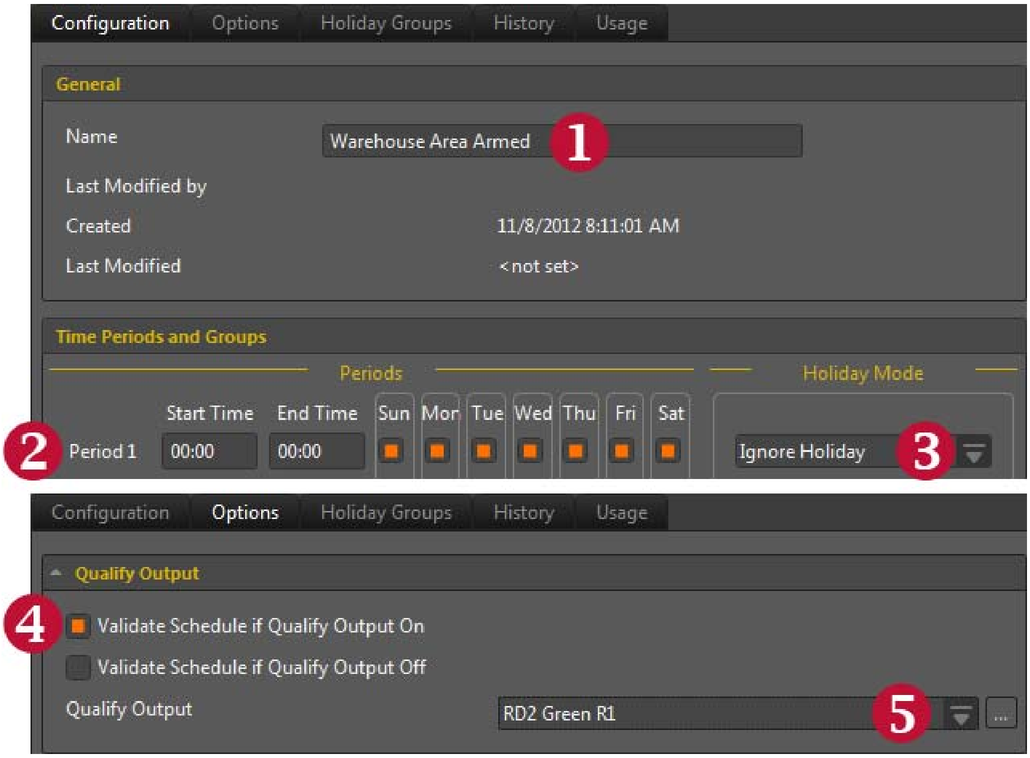
Let's also add the Office to Warehouse door beeper and LED's to the Office output groups:

- Navigate to Groups | Output Groups
- Select the Office Area Arming output group and add the RD2 Beeper R2 output
- Select the Office Area Armed output group and add the RD2 Green R2 output

The Office to Warehouse readers will now indicate if either area is armed. This makes sense as users in the unarmed portion will now have indication as to why they can't enter the other area.

Warehouse Armed Schedule

Now we need to create the schedule that will change the Warehouse Roller door type between Card and Card and PIN modes:



Name: Warehouse Area Armed

Last Modified by

Created: 11/8/2012 8:11:01 AM

Last Modified: <not set>

Time Periods and Groups

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Period 1	00:00	00:00	☑	☑	☑	☑	☑	☑	☑

Holiday Mode: Ignore Holiday

Qualify Output

☑ Validate Schedule if Qualify Output On

□ Validate Schedule if Qualify Output Off

Qualify Output: RD2 Green R1

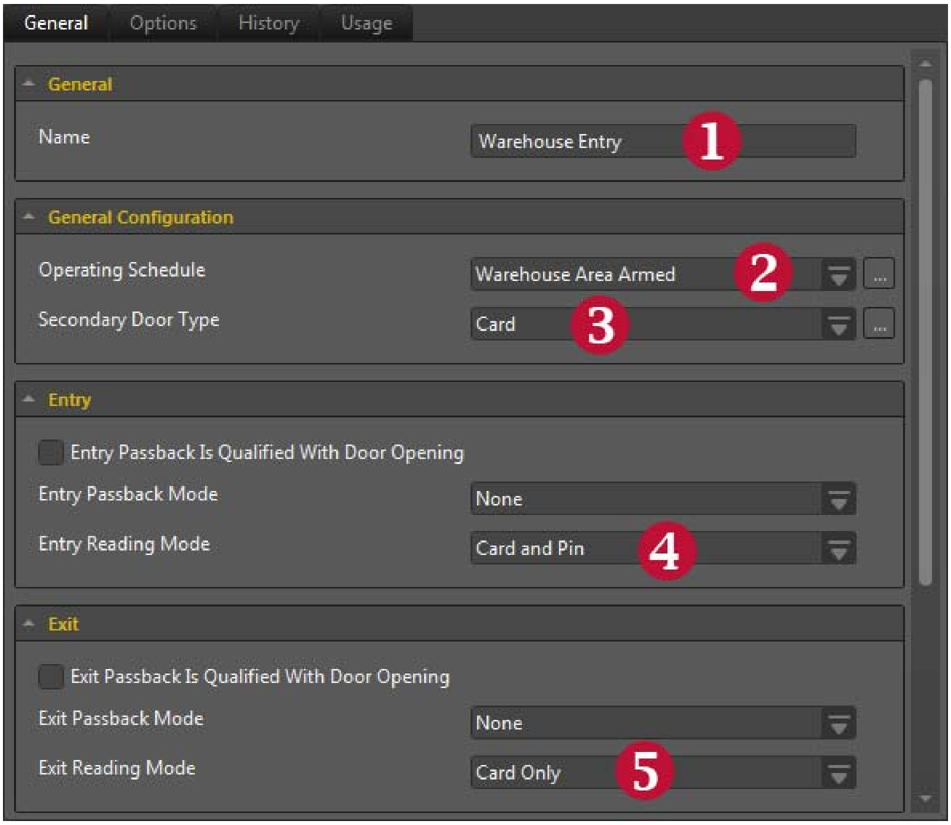
1. Create a new schedule called Warehouse Area Armed
2. Enable every day for Period 1
3. Set the holiday mode to Ignore Holiday
4. Go to the Options tab and enable the Validate Schedule is Qualify Output On option
5. Set the Qualify Output to RD2 Green R1

RD2 Green R1 is the Green LED on the Multiprox reader. This is only used to show when the Warehouse area is armed.

Create the Warehouse Door Type

1. Create a new door type called **Warehouse Entry**
2. Set the **Operating Schedule** to **Warehouse Area Armed**
3. Set the **Secondary Door Type** to **Card**

   This means that when the Warehouse is disarmed the schedule is invalid and the door type will change to Card only.



General

Name: Warehouse Entry

General Configuration

Operating Schedule: Warehouse Area Armed

Secondary Door Type: Card

Entry

□ Entry Passback Is Qualified With Door Opening

Entry Passback Mode: None

Entry Reading Mode: Card and Pin

Exit

□ Exit Passback Is Qualified With Door Opening

Exit Passback Mode: None

Exit Reading Mode: Card Only

4. Set the **Entry Reading Mode** to **Card and PIN**
5. Set the **Exit Reading Mode** to **Card Only**

   Now, when the area is armed, the entry reader will require a PIN. The exit reader will not ever require a PIN.

6. Navigate to **Programming | Doors** and select the **Warehouse Roller** door
7. Set the **Door Type** to **Warehouse Entry**

Testing the System

Now, we are going to test everything...

Before we do this, **disarm** all areas.

Testing the Office Area

- Arm the office area. The beepers on the Keypad, Office Entry door and Office to Warehouse door should start beeping

  This gives anyone still in the warehouse an **audible** warning that the Office area is arming
- Once armed, the Keypad red LED, and the LED's on the Office Entry door and the Office to Warehouse door should be flashing

  From outside the office, there is now **visual** indication that the Office area is armed.
- Badge Card 6 (our warehouse supervisor) at the Office to Warehouse exit reader (this is the reader that would be on the warehouse side of the door)

  You should be **denied** access as the Office Area is armed
- Badge Card 6 at the Office to Warehouse entry reader (this is the reader that would be on the office side of the door)

  Access is **granted**. If our warehouse supervisor happened to be trapped in the office when it was armed, she can still get out. Notice that the Office area stays armed.
- Badge Card 3 (our office worker) at the Warehouse to Office reader

  Access is granted and the area is disarmed. The Office Entry door also unlocks.
- Badge Card 6 (our warehouse supervisor) at the Warehouse to Office reader

  This time it is granted. There are now office staff present so access is allowed.

Testing the Warehouse Area

- Badge Card 6 (our warehouse supervisor) at the Warehouse Roller entry reader.

  Access should be granted without requiring a PIN.

- Double badge Card 6 (our warehouse supervisor) at the Warehouse to Office reader. The beepers on the Warehouse Roller and Office to Warehouse door should start beeping.

  Now anyone in the office will get an **audible** warning that the warehouse area is arming.

- Once armed, the LED's on the Warehouse Roller door and the Office to Warehouse door should be flashing

  From outside the warehouse there is now **visual** indication that the Warehouse area is armed.

- Badge Card 3 (our office worker) at the Office to Warehouse reader

  Access is **denied** as the Warehouse is armed.

- Badge Card 3 (our office worker) at the Warehouse to Office reader

  Access is **granted**, allowing our office worker to escape from the Warehouse if they get trapped.

- Badge Card 6 (our warehouse supervisor) at the Warehouse Roller entry reader

  This time a **PIN** is required

- Type 8837 and press Enter

  Access is **granted** and the area is **disarmed**

- Badge Card 3 (our office worker) at the Office to Warehouse reader

  Access is **granted** as there are now warehouse staff present.

- Badge Card 3 (our office worker) at the Warehouse Roller reader

  Access is **denied** as the Office door group does not include the Warehouse Roller door.

Review Questions

Which of the following is a good example of where a Qualify Output should be used to validate a schedule?

- □ To change a Doors entry reading mode when an area is armed
- □ To keep a door locked on a holiday
- □ To turn on the keypad red LED when an area is armed
- □ To unlock a door when an area is disarmed

To enable automatic disarming of an area when access to a door is granted, which of the following must be configured?

- □ Area Inside Door (Set in door programming) and Disarm Users Area On Valid Card (Set in reader expander programming)
- □ Reader One Arming Mode (Set in reader expander programming) and Disarm Users Area On Valid Card (Set in reader expander programming)
- □ Area Inside Door (Set in door programming) and Disarm Area For Door On Access (Set in reader expander programming)
- □ Reader One Arming Mode (Set in reader expander programming) and Disarm Area For Door On Access (Set in reader expander programming)

If the first door on a reader expander has in and out readers, which of the following statements are correct?

- □ D0 of the entry reader must be wired into D0 of reader port 2
- □ D1 of the entry reader must be wired into D1 of reader port 2
- □ D0 of the exit reader must be wired into D0 of reader port 2
- □ D1 of the exit reader must be wired into D1 of reader port 2

Module 136:
System Monitoring

This modules explains how trouble inputs can be used to monitor the status and condition of the system, and describes how offsite monitoring can be achieved over a PSTN phone line and / or via any of the supported IP protocols across the internet.

In This Module

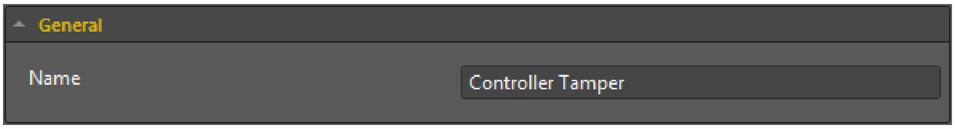
Trouble Inputs

A Trouble Input is a **logical entity** that behaves like a physical input, but changes state based on the state of a system trouble condition. For example, AC Fail or Battery Low.

- In a normal condition, the Trouble Input is closed, much like a PIR that is not detecting any movement.
- When a trouble conditions occurs, the associated Trouble Input opens.

Trouble Input Programming

Trouble Inputs are programmed much like a physical input, starting with the name.



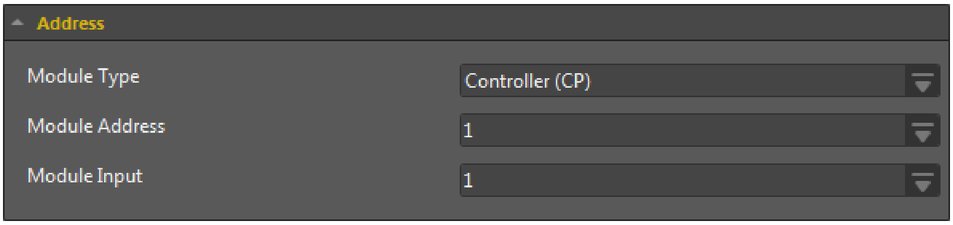
General

Name	Controller Tamper

The Add Controller and Add Expander wizards provide the option to create Trouble Inputs for you, but we recommend you format these to include at least the site code (for example **Controller Tamper TXS**) to allow for easy identification.

Module Address

Trouble Inputs also have a module address, just like physical inputs:



Address

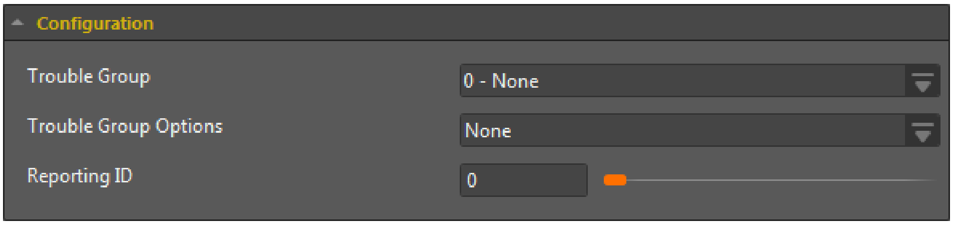
Module Type	Controller (CP)
Module Address	1
Module Input	1

These are described for each hardware module in the corresponding installation manual.

Some Trouble Inputs are not applicable to a particular type of module. For instance, Trouble Input 1 on a Controller is Controller Tamper. The PCB Controller has an onboard tamper, but the DIN Controller does not. Trouble Input 1 on a DIN Controller will never open.

Contact ID Configuration

The **Configuration** section is used to override the default Contact ID settings. Leave these as is unless you have a specific requirement for reporting codes.

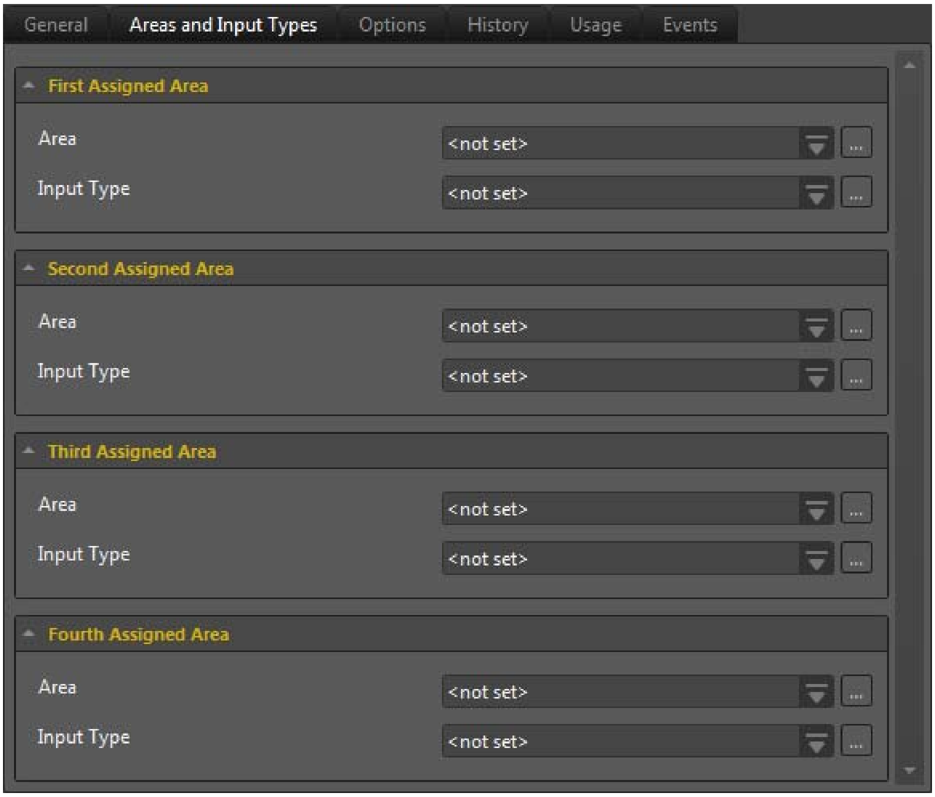


Configuration

Trouble Group	0 - None
Trouble Group Options	None
Reporting ID	0

Areas

Trouble Inputs, just like physical inputs, must be programmed to an Area and assigned an Input Type before they will generate an alarm.



General | Areas and Input Types | Options | History | Usage | Events

First Assigned Area
Area <not set>
Input Type <not set>

Second Assigned Area
Area <not set>
Input Type <not set>

Third Assigned Area
Area <not set>
Input Type <not set>

Fourth Assigned Area
Area <not set>
Input Type <not set>

Trouble Inputs can be assigned up to four areas, and will be processed individually by each area based on the Input Type assigned.

Create a Trouble Area

To monitor Trouble Inputs, we will need a new area:

- Navigate to Programming | Areas
- Create a new area called System TXS
- Switch to the Configuration tab and set the Entry and Exit delay times to 0

  We want to be able to arm instantly

Trouble Input Pruning

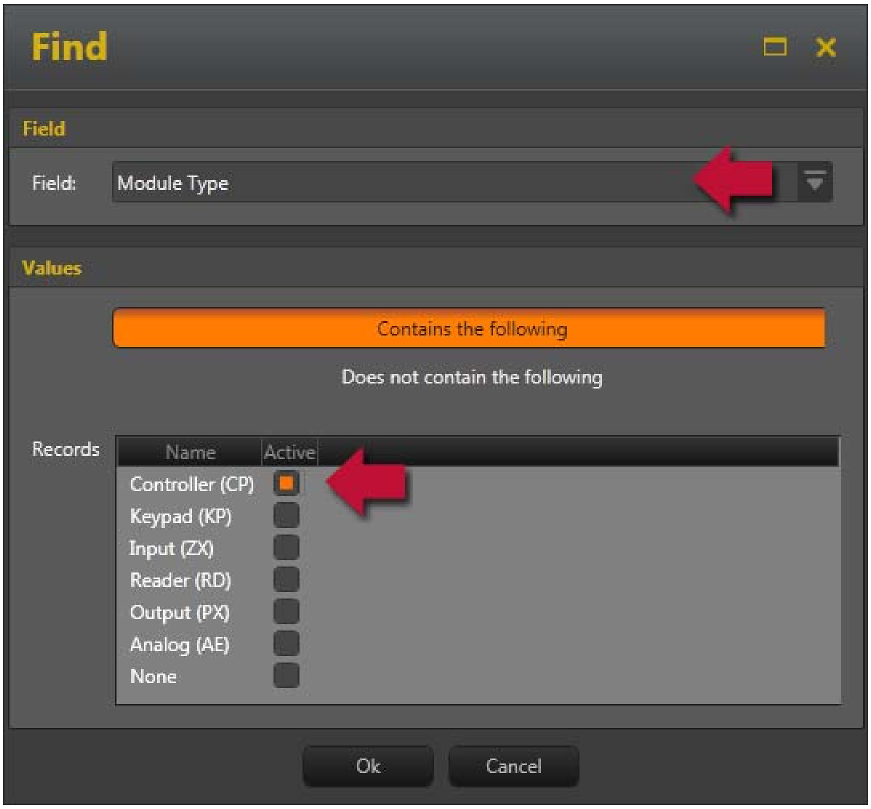
Navigate to Programming | Trouble Inputs.

The Add Controller Wizard automatically added all possible trouble inputs for all the modules it created. To keep the system tidy we will now go through and delete the irrelevant Trouble Inputs.

It is much quicker to use the Wizard to create everything, then delete the items that are not required.

Controller Trouble Inputs

1. Use the Find tool to select only the Trouble Inputs on the Controller.



Find

Field

Field: Module Type

Values

Contains the following

Does not contain the following

Records

Name	Active
Controller (CP)	☑
Keypad (KP)	□
Input (ZX)	□
Reader (RD)	□
Output (PX)	□
Analog (AE)	□
None	□

2. Using the CTRL key, select the following records:
   - Controller Tamper
   - Battery Low / Missing
   - Bell Siren 2 Tamper / Cut
   - Expansion Interface Fault
   - Communication Port 1 Fault / Missing
   - Communication Port 2 Fault / Missing
   - Communication Port 3 Fault / Missing
   - Communication Port 4 Fault / Missing
   - DVAC Communication Polling Lost
   - Service 1 State Stopped
   - Service 2 State Stopped
   - Service 3 State Stopped
   - Service 4 State Stopped

- Click **Delete**
- Rename the **AC Failure** trouble input to **12VDC Supply Failure**

Keypad Trouble Inputs

- Use the Find tool to select the Keypad trouble inputs
- Select and delete the Door Left Open and Door Forced Open records

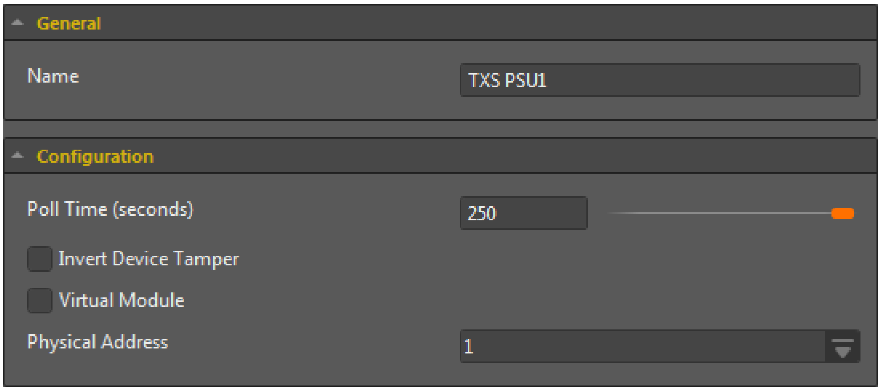
Reader Expander Trouble Inputs

- Find the Reader Expander trouble inputs
- Delete the following records from both Reader Expanders:
  - Module Tamper
  - AC Failure
  - Battery Low / Missing
  - Auxillary Fuse / Supply Fault
  - Lock 1/2 Output Problem
  - Reader 1 Fuse / Supply Fault
  - Reader 2 Fuse / Supply Fault

Add the Power Supply Module

The Add Controller Wizard does not currently add Power Supply modules so we'll add this now:

- Navigate to Expanders | Analog Expanders
- Add a new Analog Expander named TXS PSU1
- Ensure the Physical Address is set at 1



General

Name: TXS PSU1

Configuration

Poll Time (seconds): 250

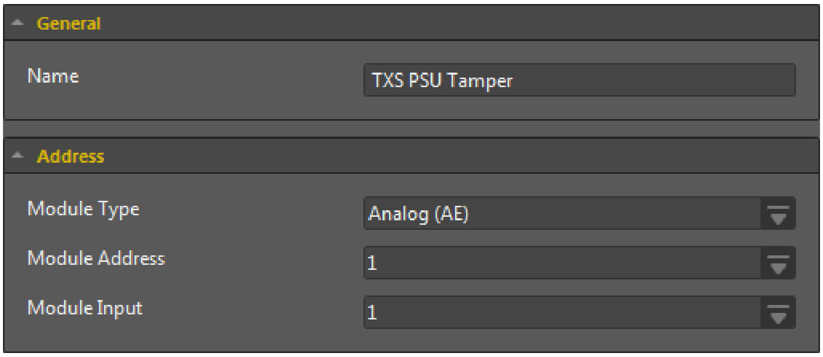
□ Invert Device Tamper

□ Virtual Module

Physical Address: 1

Add a Trouble Input

- Navigate to Programming | Trouble Inputs
- Add a new trouble input named TXS PSU Tamper
- Set the Module Type to Analog (AE)
- Set the Module Address to 1
- Set the Module Input to 1



General

Name: TXS PSU Tamper

Address

Module Type: Analog (AE)

Module Address: 1

Module Input: 1

Add Additional Trouble Inputs

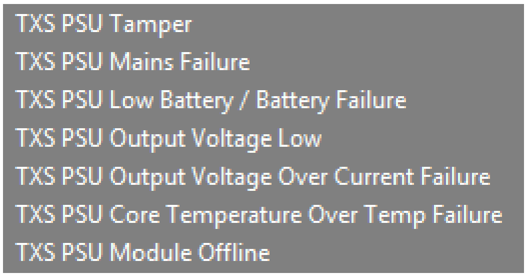
- Add the remaining Trouble Inputs from the table as shown (excluding 7)

Input Number	Description
AExxx:01	Module Tamper
AExxx:02	Mains Failure
AExxx:03	Low Battery / Battery Failure
AExxx:04	Output Voltage Low
AExxx:05	Output Over Current Failure
AExxx:06	Core Temperature Over Temp Failure
AExxx:07	Reserved
AExxx:08	Module Offline

- Adjust the name and set the Module Input number accordingly.

  For instance TXS PSU Mains Failure should be Module Input 2

  You should end up with a list like this:

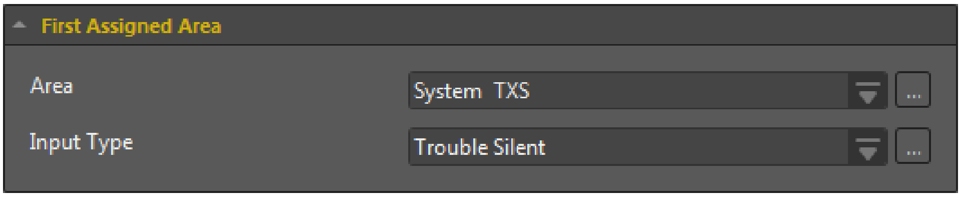


TXS PSU Tamper
TXS PSU Mains Failure
TXS PSU Low Battery / Battery Failure
TXS PSU Output Voltage Low
TXS PSU Output Voltage Over Current Failure
TXS PSU Core Temperature Over Temp Failure
TXS PSU Module Offline

Adding Trouble Inputs to the System Area

We're now left with a list of active trouble inputs

- Select all the trouble inputs (CTRL+A) then click the Areas and Input Types tab
- Set the first Area to our new System area
- Set the first Input Type to Trouble Silent



First Assigned Area

Area: System TXS

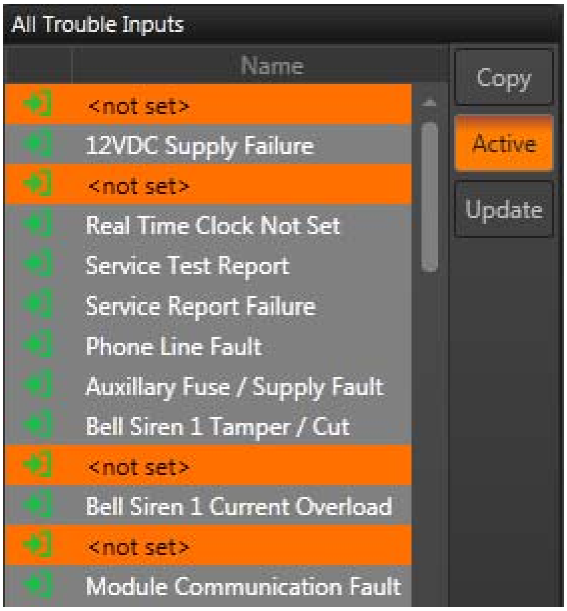
Input Type: Trouble Silent

- Click Save to update the records

We've now added all the Trouble Inputs to the System Area.

View the Status Page

You'll notice that the Status Page now has links to missing Trouble Inputs:



All Trouble Inputs

Name

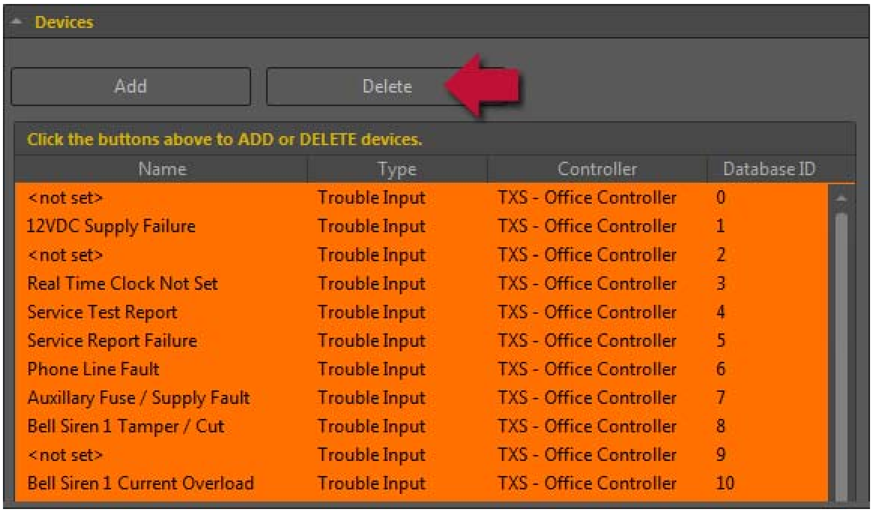
<not set>
12VDC Supply Failure
<not set>
Real Time Clock Not Set
Service Test Report
Service Report Failure
Phone Line Fault
Auxillary Fuse / Supply Fault
Bell Siren 1 Tamper / Cut
<not set>
Bell Siren 1 Current Overload
<not set>
Module Communication Fault

It also doesn't include the new System area.

Updating Status Lists

We'll start by removing all of the old Trouble Inputs:

1. Navigate to Monitoring | Setup | Status Lists
2. Select the All Trouble Inputs status list
3. Highlight all the Trouble Inputs (CTRL+A) under the Devices window



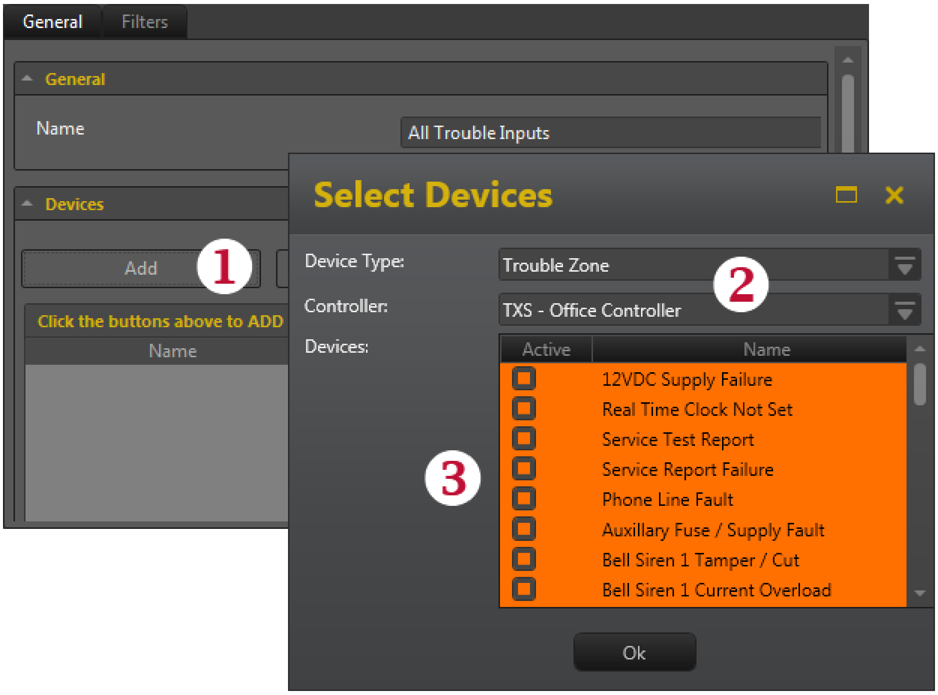
Click the buttons above to ADD or DELETE devices.

Name	Type	Controller	Database ID
<not set>	Trouble Input	TXS - Office Controller	0
12VDC Supply Failure	Trouble Input	TXS - Office Controller	1
<not set>	Trouble Input	TXS - Office Controller	2
Real Time Clock Not Set	Trouble Input	TXS - Office Controller	3
Service Test Report	Trouble Input	TXS - Office Controller	4
Service Report Failure	Trouble Input	TXS - Office Controller	5
Phone Line Fault	Trouble Input	TXS - Office Controller	6
Auxillary Fuse / Supply Fault	Trouble Input	TXS - Office Controller	7
Bell Siren 1 Tamper / Cut	Trouble Input	TXS - Office Controller	8
<not set>	Trouble Input	TXS - Office Controller	9
Bell Siren 1 Current Overload	Trouble Input	TXS - Office Controller	10

4. Click Delete

Then we will re-add our current Trouble Inputs:

1. Click Add to open the Select Devices window
2. Set the Device Type to Trouble Zone and choose your Controller
3. To quickly select all devices, click an item and press CTRL+A then check any of the boxes to select them all



Name: All Trouble Inputs

Select Devices

Device Type: Trouble Zone

Controller: TXS - Office Controller

Devices:

Active	Name
□	12VDC Supply Failure
□	Real Time Clock Not Set
□	Service Test Report
□	Service Report Failure
□	Phone Line Fault
□	Auxillary Fuse / Supply Fault
□	Bell Siren 1 Tamper / Cut
□	Bell Siren 1 Current Overload

4. Click OK then select Save

And finally, we'll add the new System area to our status page:

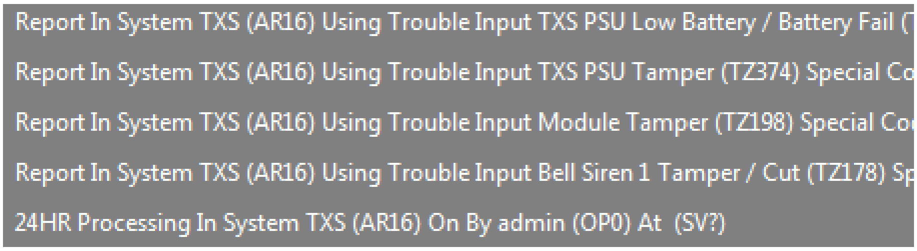
1. Select the **All Doors and Areas** Status List
2. Click **Add** to open the **Select Devices** window
3. Set the **Device Type** to Area and choose your **Controller**
4. Check the new System area and click **OK**
5. Save your changes

If your status page is already open, you will need to close it and open it again for the changes to take place.

Arm the System Area

From the Technician status page, arm the 24hr portion of the System area.

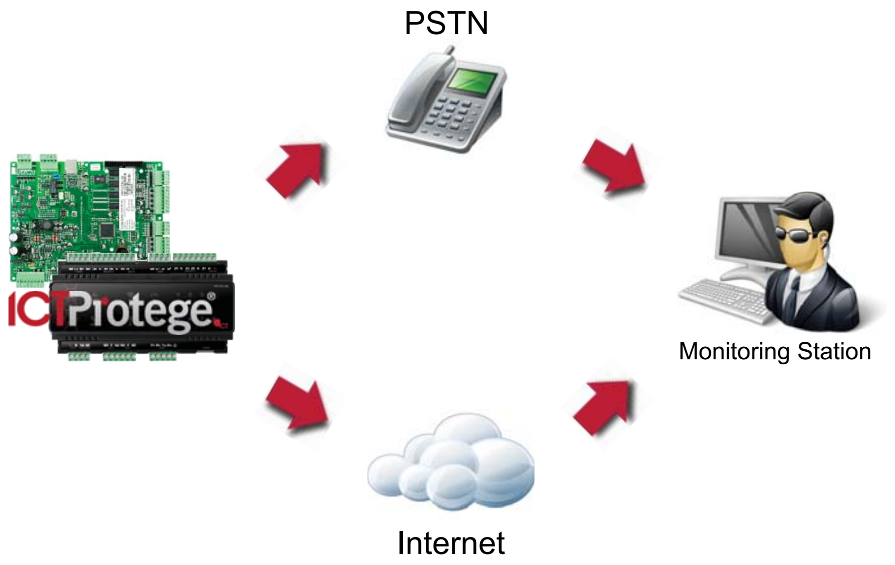
You should see some Trouble Inputs create alarms:



```
Report In System TXS (AR16) Using Trouble Input TXS PSU Low Battery / Battery Fail (T
Report In System TXS (AR16) Using Trouble Input TXS PSU Tamper (TZ374) Special Co
Report In System TXS (AR16) Using Trouble Input Module Tamper (TZ198) Special Co
Report In System TXS (AR16) Using Trouble Input Bell Siren 1 Tamper / Cut (TZ178) Sp
24HR Processing In System TXS (AR16) On By admin (OP0) At  (SV?)
```

Contact ID Monitoring

Offsite monitoring can be achieved using either ContactID or SIA over a PSTN phone line and / or via any of the supported IP protocols across the internet.

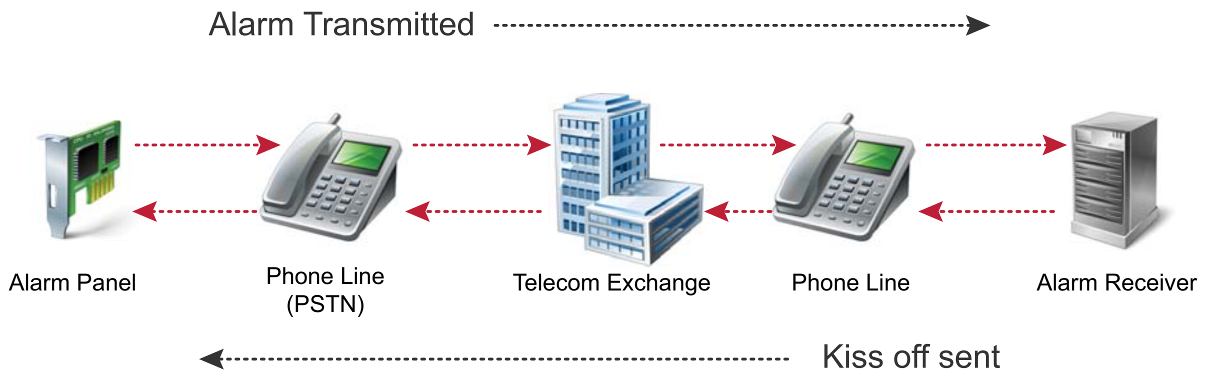


Both options are built in to all Protege controllers and do not require any additional hardware or licenses.

Traditional Analog CID Monitoring

When alarm systems first started reporting to a central monitoring station they often used a third party alarm dialler. This device had one or more inputs onboard, which would initiate a phone call to a central monitoring station. The dialler would use either a series of pulses or beeps, or DTMF tones to communicate a message to an alarm receiver at the monitoring station, much like morse code.

Contact ID Alarm Transmission



As alarm monitoring became more popular, more and more alarm panels came out with onboard diallers, and the industry started to settle on a number of standards or protocols for the communication of alarms.

Contact ID seems to have become one of the most popular of these protocols, and is supported be most modern alarm systems.

Contact ID uses DTMF tones to communicate alarms in the following format:

1234	18	1131	01	015	8
Account	Type	Event	Area	Zone	Chksum

where:

1234 = The account number (1234)

18 = The message type used to identify the message as Contact ID

1131 = The event qualifier (1) for a new event, followed by the event code for perimeter burglary

01 = The partition or area number (1)

015 = The zone number (015)

8 = The checksum

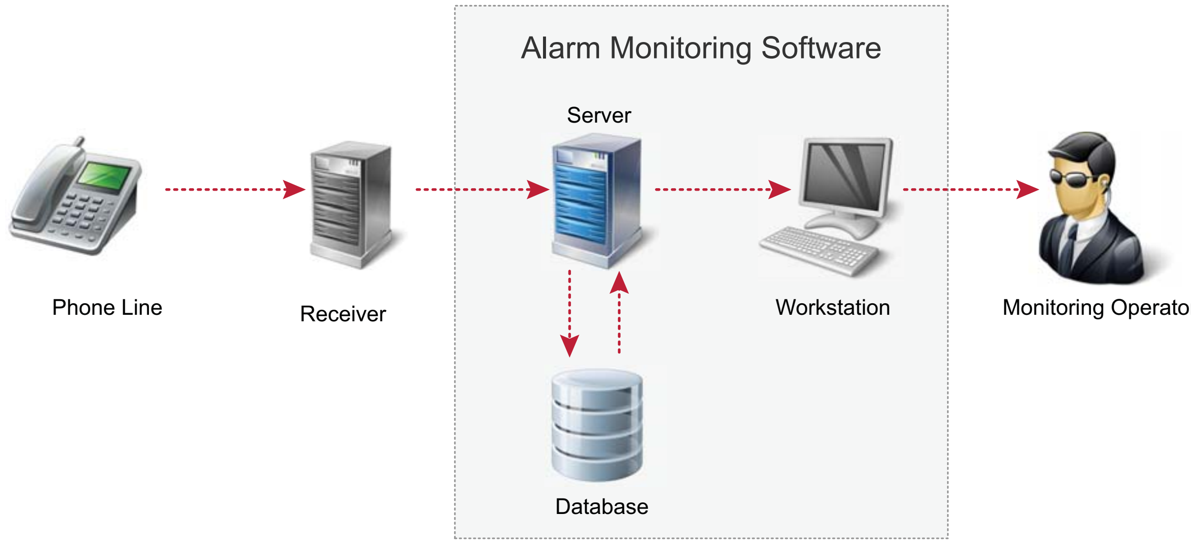
The entire message can be looked at like this:

0800 123 456	123 18 1131 01 015 8
Phone Number	Contact ID String

The panel dials the pre-programmed phone number then waits for the handshake tone. When it receives the handshake tone, it transmits the CID string then waits for the kiss-off tone from the receiver.

The software running at the central monitoring station then picks these alarm messages up from the receiver, looks up the account and zone names on its database and displays the alarm to the operator.

Contact ID Alarm Processing

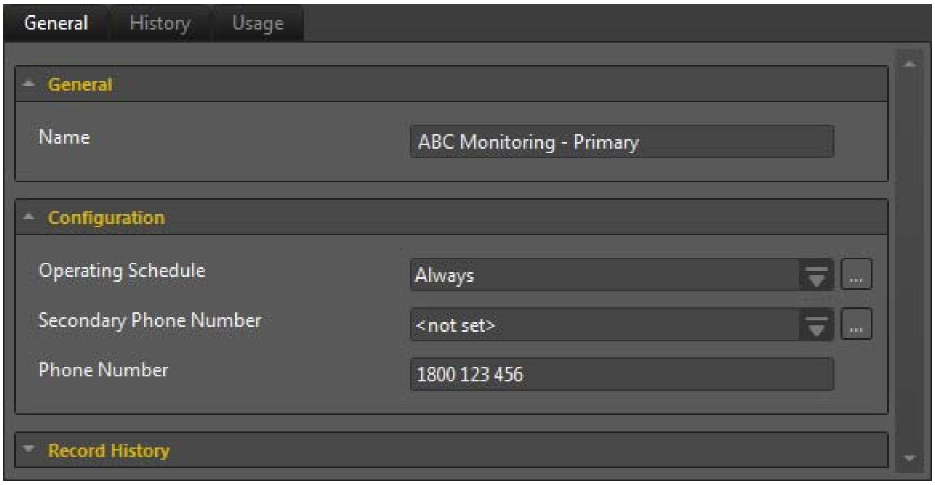


As Contact ID only sends a bunch of numbers representing account, area and zone, the monitoring operator relies on the database inside the monitoring software being accurate. The information they receive is only ever as good as that provided by the technician during installation.

Adding a Phone Number

For any PSTN based monitoring service, at least one phone number is required for communication.

- Navigate to Programming | Phone Numbers and click Add



Name: ABC Monitoring - Primary

Operating Schedule: Always

Secondary Phone Number: <not set>

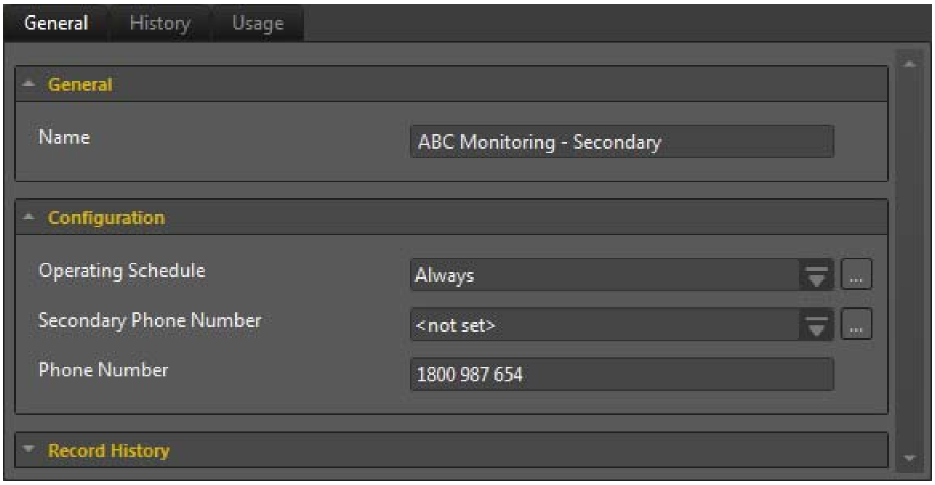
Phone Number: 1800 123 456

- Enter the Name and primary Phone Number of your monitoring station
- Save your changes

Adding a Secondary (Backup) Phone Number

Most monitoring stations have a secondary number to be used as a backup in case the first fails.

- Click Add to create another record



Name: ABC Monitoring - Secondary

Operating Schedule: Always

Secondary Phone Number: <not set>

Phone Number: 1800 987 654

- Enter the Name and secondary/backup Phone Number of your monitoring station
- Save your changes

Services

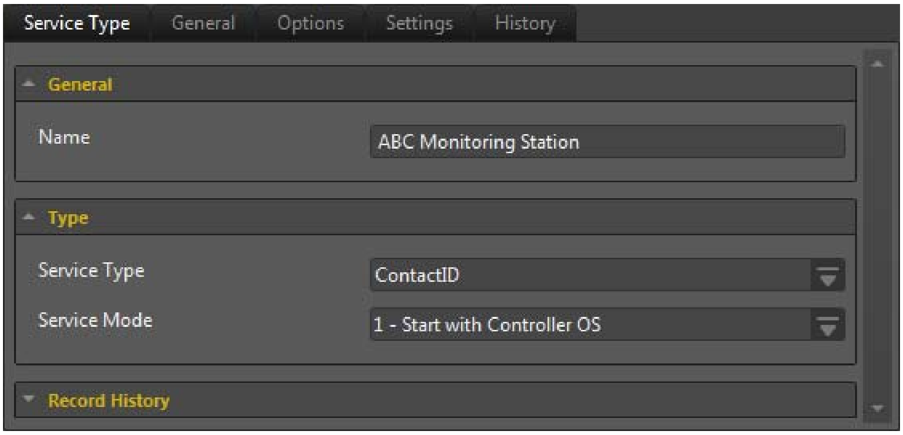
Services provide interaction between Protege GX and external systems. Services include:

- ContactID
- SIA
- Report IP
- and many other options for automation and control

Services run on Protege GX Controllers, so are not reliant on the Protege GX Server.

Configure the Contact ID Service

1. Navigate to **Programming | Services**
2. Select your Controller then click **Add** to create a new service



General

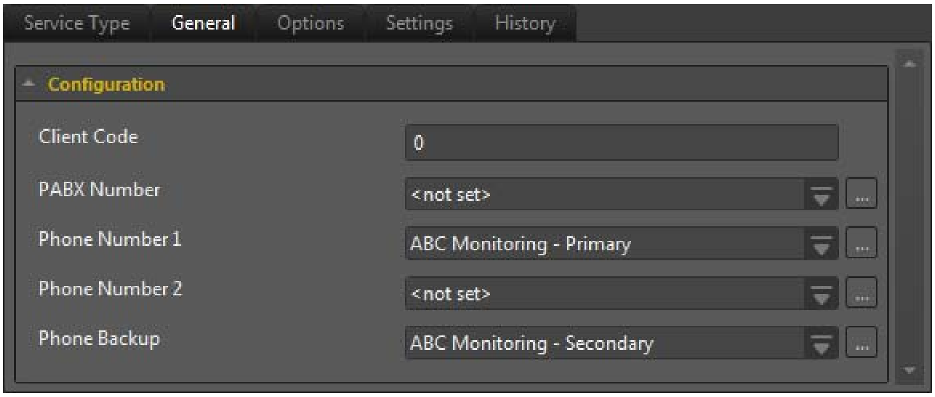
Name	ABC Monitoring Station

Type

Service Type	ContactID
Service Mode	1 - Start with Controller OS

3. Set the **Service Type** to **ContactID**
4. Set the **Service Mode** to **Start with Controller.** This ensures that the service is started automatically whenever power is cycled to the controller. If left at Manual Mode, the service will need to be manually starting each time the controller is reset or restarted.
5. Select the **General** tab:
   - Enter the **Client Code** (or account number) as supplied by the monitoring station.

   If the Controller must dial a number to gain an outside line (for instance, 1 or 9), create a separate phone number, then select it as the **PABX Number.**



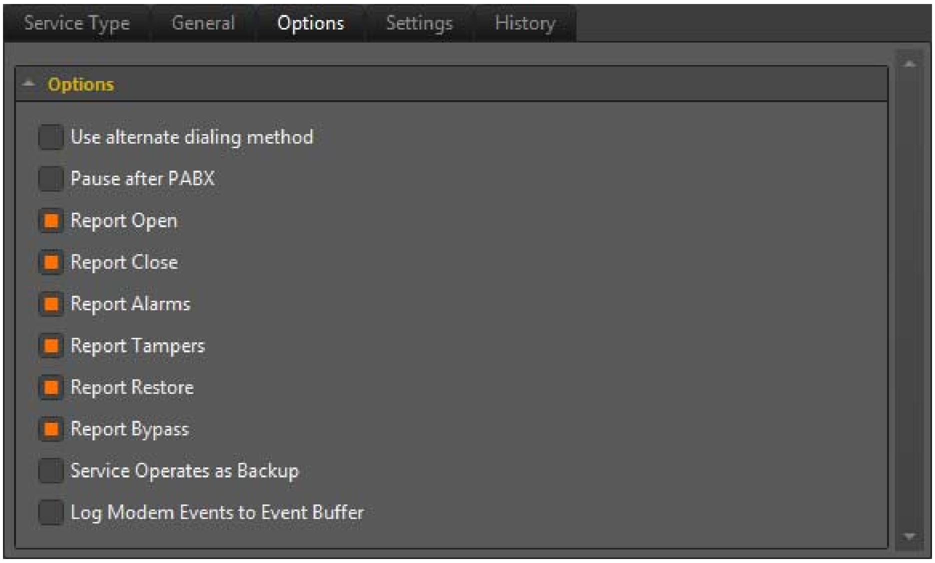
Configuration

Client Code	0
PABX Number	<not set>
Phone Number 1	ABC Monitoring - Primary
Phone Number 2	<not set>
Phone Backup	ABC Monitoring - Secondary

- Set **Phone Number 1** to the primary phone number of the monitoring station
- Set **Phone Backup** to the second number we defined earlier. This number will be dialed if a connection to the monitoring station cannot be made on the Phone 1 number. This can be an alternative monitoring station.

Phone Number 2 is only programmed when you require monitoring signals to be sent to two different phone numbers simultaneously. This is not a backup phone number.

6. Select the **Options** tab and enable the reporting options for the signals that you wish to be sent by this service:

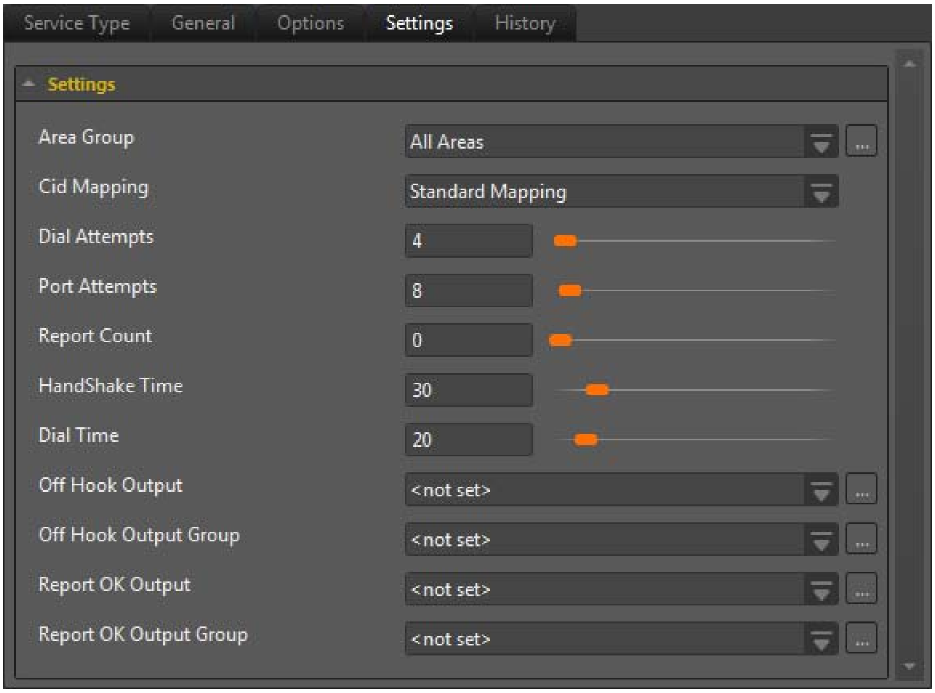


Options

- □ Use alternate dialing method
- □ Pause after PABX
- ☑ Report Open
- ☑ Report Close
- ☑ Report Alarms
- ☑ Report Tampers
- ☑ Report Restore
- ☑ Report Bypass
- □ Service Operates as Backup
- □ Log Modem Events to Event Buffer

- **Open** and **Close**: Reports all area arming and disarming signals. This is usually only enabled for commercial premises.
- **Alarms**, **Tampers** and **Restore**: Reports the corresponding input state changes.
- **Bypass**: Reports if a user bypasses an input. This is usually only enabled for commercial premises.

7. Select the **Settings** tab



Settings

Area Group	All Areas
Cid Mapping	Standard Mapping
Dial Attempts	4
Port Attempts	8
Report Count	0
HandShake Time	30
Dial Time	20
Off Hook Output	<not set>
Off Hook Output Group	<not set>
Report OK Output	<not set>
Report OK Output Group	<not set>

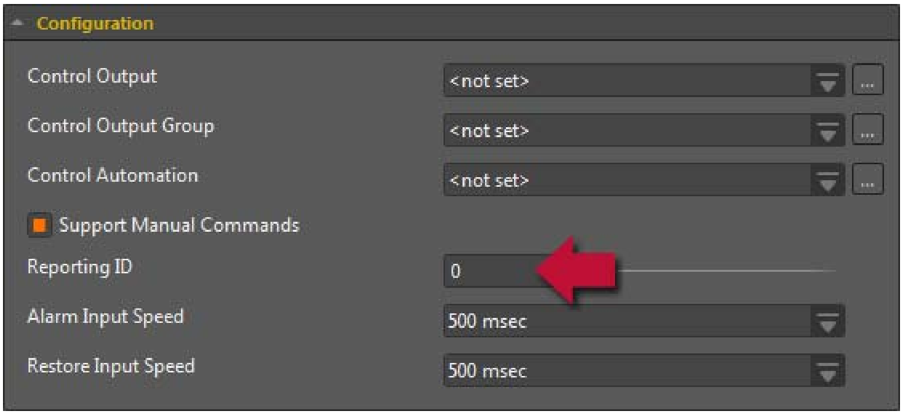
- The **Area Group** defines which group of areas the service is responsible for monitoring.

  By default, it is set to **All Areas** which means that signals generated by any area will be reported offsite by the service. This is particularly useful when dealing with a multi tenanted building where ContactID services can be set up for each tenant and Area Groups configured for each.
- The **CID Mapping** sets a standard predefined monitoring template. The two templates (Standard or Large) automatically map zone numbers to Protege GX inputs. We'll use **Standard Mapping**.

CID Mapping is covered in greater detail in the Level 2 qualification. Definitions of the two reporting maps are available on the ICT website along with a report map generator which produces a report to provide to the monitoring station.

Overriding CID Mapping

To override the settings of the report maps, individual Contact ID codes can be programmed at each input:

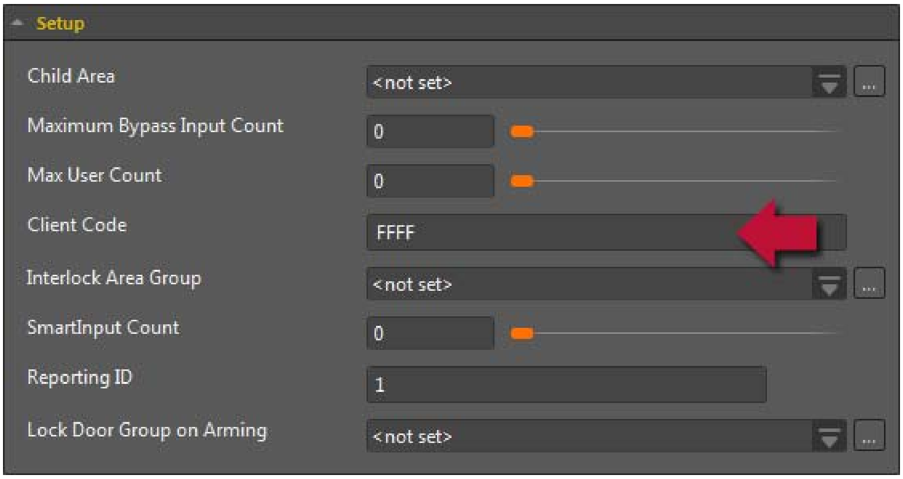


Configuration

Control Output	<not set>
Control Output Group	<not set>
Control Automation	<not set>
☑ Support Manual Commands	
Reporting ID	0
Alarm Input Speed	500 msec
Restore Input Speed	500 msec

If left as 0, it will follow the report map.

To override the account code for each area, program the **Client Code** setting in the area:



Setup

Child Area	<not set>
Maximum Bypass Input Count	0
Max User Count	0
Client Code	FFFF
Interlock Area Group	<not set>
SmartInput Count	0
Reporting ID	1
Lock Door Group on Arming	<not set>

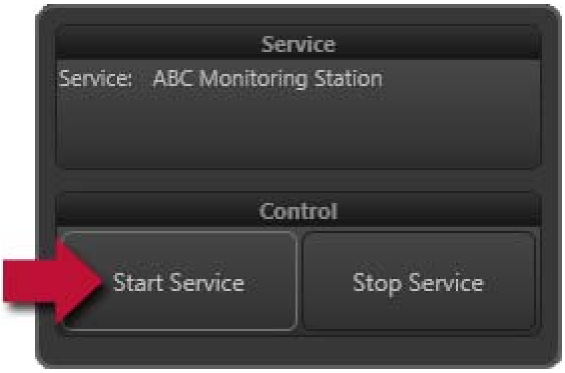
If left as FFFF, it will follow the client code programmed in the service.

The **Reporting ID** is used to identify the area to the monitoring company when a report is generated.

Start the Service

Once a service has been configured, it must be started.

Right click the service from the Record List and choose **Start Service:**



Service: ABC Monitoring Station

IP Monitoring

As technology improves and more and more services and functions are being performed on computer networks or the internet, traditional analog systems are being forced into the digital world.

Why IP Monitoring?

Analog technologies such as copper phone lines are becoming more costly to maintain, and are therefore more expensive for the end user.

In some cases, they are simply non-existent. Analog alarm dialers are no exception. Many businesses and now even new residential subdivisions are moving to fibre to the door. This means no analog phone lines, and VoIP for communications.

The problem with VoIP for alarm dialers is that due to many of the compression techniques used, the handshake, DTMF, and kiss-off tones are often completely lost on transmission.

Sometimes it is the **cost** of a traditional phone line that is prompting the move to digital.

- Every business call costs money
- If your site only sends open and close messages every day, you are looking at an added cost just for the calls alone
- If your average site has 2 alarm activations per month, add more money to this cost
- If your analog phone line is only being used for the alarm, add another charge for the line rental

These costs add up!

Moving your alarm system to a fully IP solution utilizing an existing internet connection can save a significant amount per site, per year. This alone can justify the cost of installing an IP alarm panel.

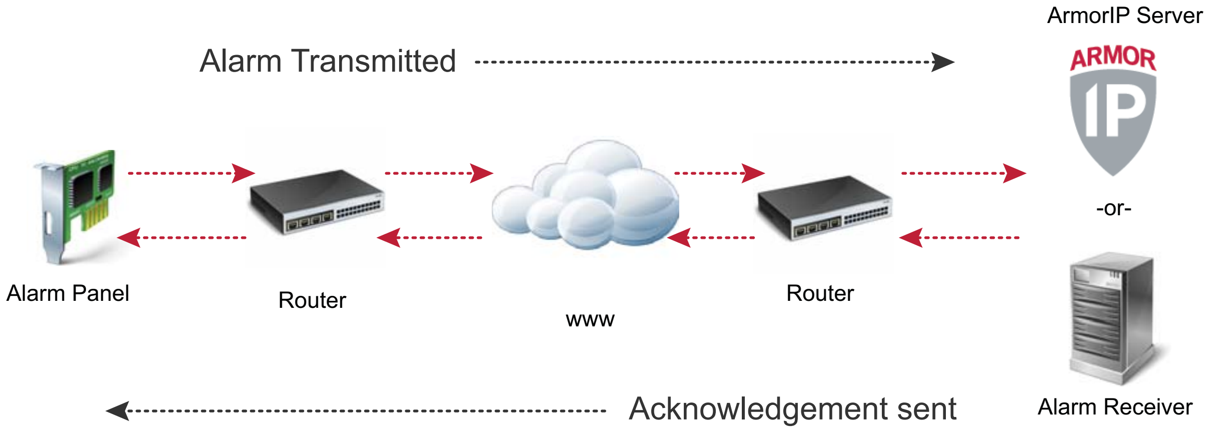
Another key feature is that IP monitoring is essentially **always online** to the monitoring station with a regular default polling time of 90 seconds. Many alarm dialers only test once every 24 hours, or sometimes only once every 5 days. Message transmission is almost instant and a lost connection can be detected in 90 seconds or less.

IP Monitoring can utilize existing IT infrastructure, and certainly won't 'tie up' the internet connection the way an alarm dialer does with a phone line. It uses such a small amount of bandwidth that it can sit on your existing network without any noticeable effect on other network traffic.

IP Alarm Monitoring

IP alarm monitoring has been developed to achieve the same thing as Contact ID alarm monitoring (to transmit an alarm message to a central monitoring station), only it does this via a network connection across the internet.

IP Alarm Transmission



The ArmorIP protocol takes the Contact ID message and encapsulates it inside a TCP/IP message. Along with this is the ability to add additional information if it is available, such as panel name, event time, panel type, serial number, zone or user name, and much more. This data is all transmitted across the internet to the monitoring station.

0800 123 456	1234 18 1131 01 015 8
Monitoring Phone Number	Contact ID String

Contact ID Format

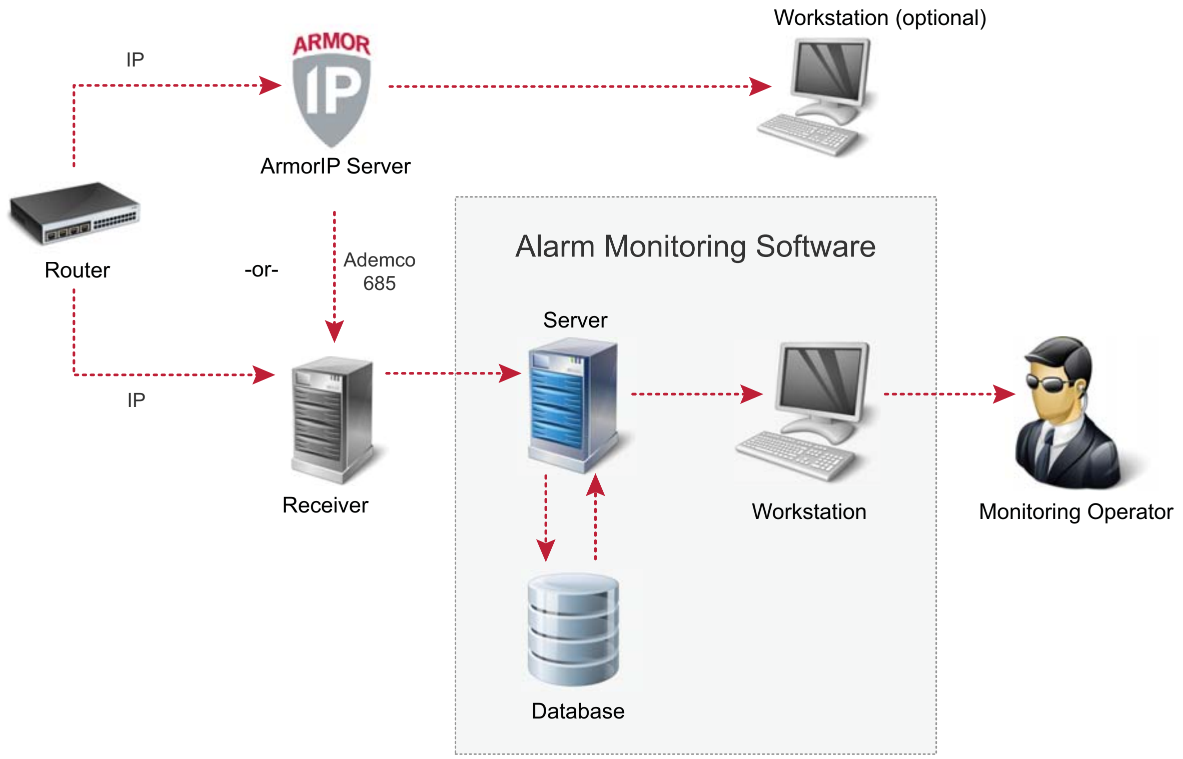
203.97.49.55		1234 18 1131 01 015 8
Monitoring IP Address	Additional Data	Contact ID String

ArmorIP Format

The message can be received at the monitoring station either by the existing receiver (if it is IP capable), or by the ArmorIP software running on a server. The ArmorIP software has the added advantage of being able to display all of the additional data that comes with the ArmorIP protocol.

This means that changes to names of users, areas and zones on site will be transmitted to the monitoring station as they are seen on site, so there are no more mismatches between what the monitoring station and the people on site are looking at.

IP Alarm Processing



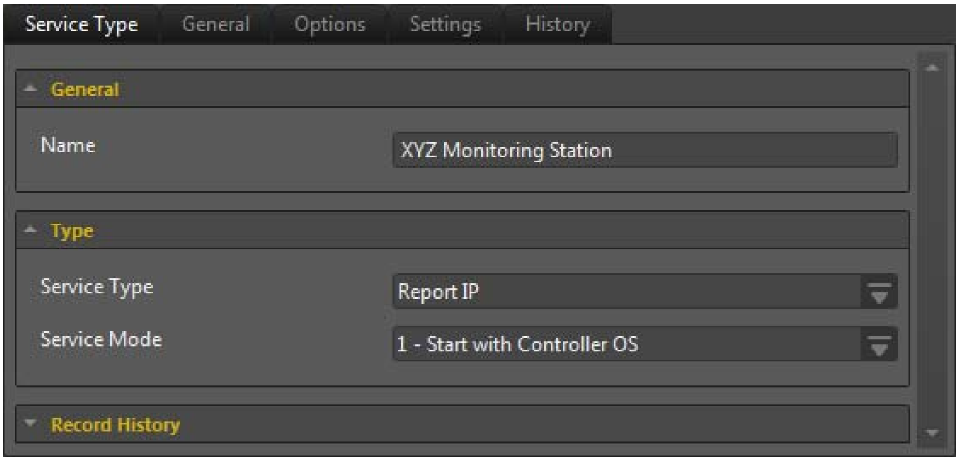
The ArmorIP server receives the IP message from the alarm panel, sends an acknowledgement to the panel, then passes the data to the alarm receiver via RS232 using the Ademco 685 protocol. This allows the monitoring station to utilize their existing software for processing and tracking the alarm, and optionally displaying the alarm direct from ArmorIP as well, to ensure the additional information received from site is seen.

IP Alarm Monitoring Key Points

- No copper phone line required = $$$ saved
- Always online
- Instant transmission of alarms
- Uses existing network infrastructure = no additional cost
- Can display additional accurate information from sites

Configure the Report IP Service

1. Navigate to **Programming | Services**
2. Select your Controller then click **Add** to create a new service



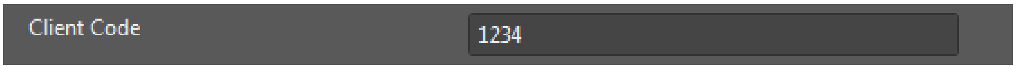
Name: XYZ Monitoring Station

Service Type: Report IP

Service Mode: 1 - Start with Controller OS

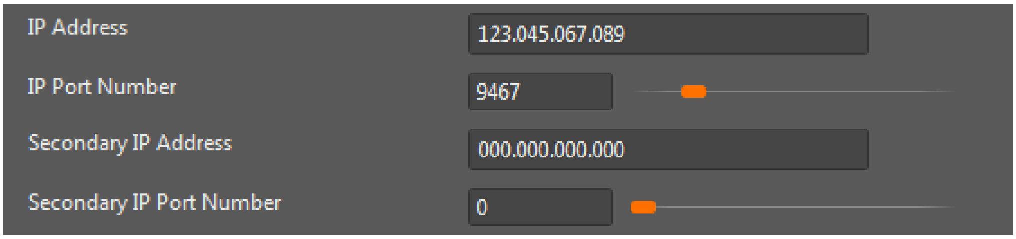
3. Set the **Service Type** to **Report IP**
4. Set the **Service Mode** to **Start with Controller.** This ensures that the service is started automatically whenever power is cycled to the controller. If left at Manual Mode, the service will need to be manually starting each time the controller is reset or restarted.
5. Select the **General** tab:

- Enter the **Client Code** (or account number). This is the code used to identify the system at the monitoring station and will usually be issued by the monitoring company.



Client Code: 1234

- Enter the connection details as supplied by your monitoring station:



IP Address: 123.045.067.089

IP Port Number: 9467

Secondary IP Address: 000.000.000.000

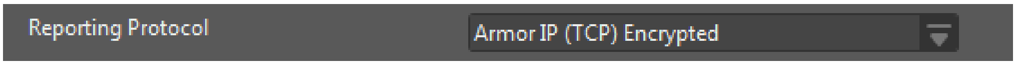
Secondary IP Port Number: 0

- **IP Address**: The IP address of monitoring station.
- **IP Port Number**: The appropriate port number (in conjunction with IP address) of the monitoring station.

If the monitoring station has a backup path, enter the **Secondary IP Address** and the **Secondary IP Port Number** to be used if the first IP address fails.

Note: Either the IP address, port, or both, should be different. If a backup path is not used, leave these set at 0.

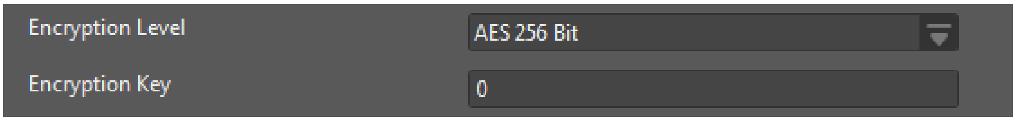
- Select the **Reporting Protocol**. This will usually be supplied by your monitoring station.



Reporting Protocol: Armor IP (TCP) Encrypted

ArmorIP is an ICT proprietary format and the only IP reporting protocol to be UL certified. Wherever possible, use **ArmorIP (TCP) Encrypted** for the most robust and secure monitoring format.

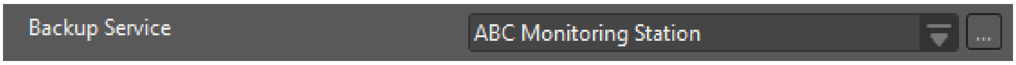
- If encryption is used, the monitoring station will supply an Encryption Level and Encryption Key that must also be entered in the service settings.



Encryption Level: AES 256 Bit

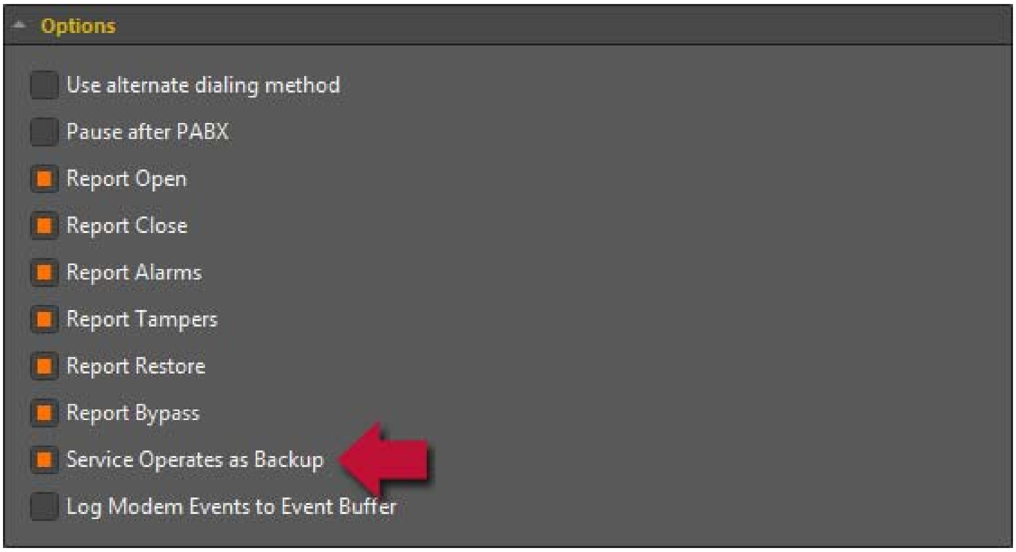
Encryption Key: 0

- If required, select a Backup Service:



Backup Service: ABC Monitoring Station

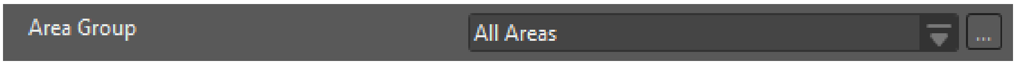
If a backup service is selected you must also enable the Service Operates as Backup option in the Contact ID service, otherwise both services will report each new event.



Options

- □ Use alternate dialing method
- □ Pause after PABX
- ☑ Report Open
- ☑ Report Close
- ☑ Report Alarms
- ☑ Report Tampers
- ☑ Report Restore
- ☑ Report Bypass
- ☑ Service Operates as Backup
- □ Log Modem Events to Event Buffer

- The Area Group defines which group of areas the service is responsible for monitoring.

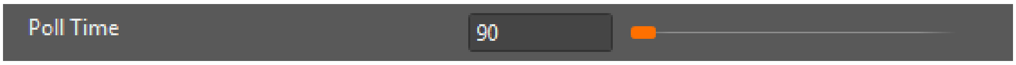


Area Group: All Areas

By default, it is set to All Areas which means that signals generated by any area will be reported offsite by the service.

- One of the advantages of IP reporting is that essentially it is always 'on'. This is achieved by sending regular poll messages.

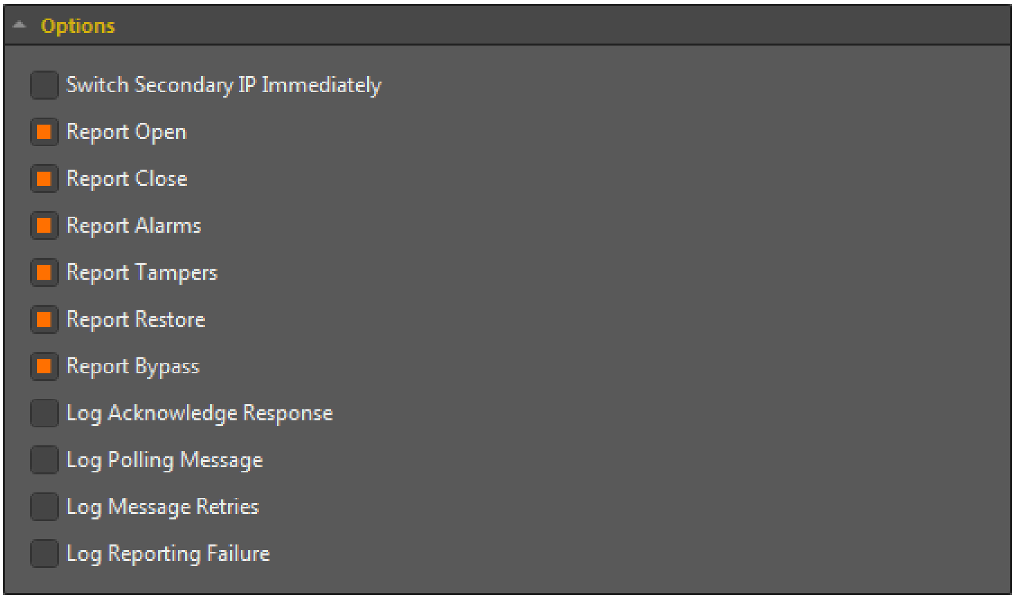
In most cases the frequency should be set to 90 seconds, however your monitoring station may request a different setting.



Poll Time: 90

IP Polling should not be confused with the 24 Hour Test Signal. The 24 Hour Test signal is still required and is a Contact ID message generated by the system once every 24 hours. The polling messages are handled by the IP protocol, and don't appear as a test signal at the monitoring station. The IP receiver software handles the regular polling internally and generates a monitoring poll fail signal locally if a regular poll is not received within a predefined period.

6. Select the **Options** tab and enable the reporting options for the signals that you wish to be sent by this service:



Options

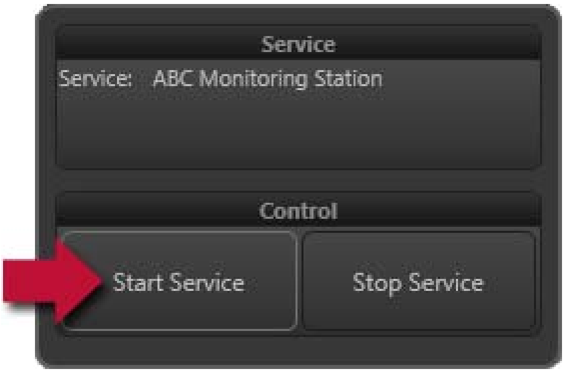
- □ Switch Secondary IP Immediately
- ☑ Report Open
- ☑ Report Close
- ☑ Report Alarms
- ☑ Report Tampers
- ☑ Report Restore
- ☑ Report Bypass
- □ Log Acknowledge Response
- □ Log Polling Message
- □ Log Message Retries
- □ Log Reporting Failure

- **Open** and **Close**: Reports all area arming and disarming signals. This is usually only enabled for commercial premises.
- **Alarms**, **Tampers** and **Restore**: Reports the corresponding input state changes.
- **Bypass**: Reports if a user bypasses an input. This is usually only enabled for commercial premises.

Start the Service

Once a service has been configured, it must be started.

Right click the service from the Record List and choose **Start Service**:



Service: ABC Monitoring Station

Review Questions

How many areas can a trouble input be assigned to?

□ 1

□ 4

□ None - Trouble inputs are automatically assigned to the System area

□ None- Trouble inputs are automatically assigned to the Trouble area

When do you need to set a Reporting ID for a Trouble Input?

□ Only if you want to use a different Reporting ID from the default reporting map

□ Only if you need offsite monitoring for that trouble input

□ Always

□ Never

When manually adding a trouble input, where can you find the Module Address to use for a particular trouble input on an expander?

□ You can assign any address as long as it is within the memory profile

□ In the installation manual for the expander module

□ Trouble inputs don't have a module address

□ The server automatically assigns the next free module address

Which of the following statements about offsite monitoring are true?

□ Contact ID is supported on all ICT Controllers with onboard dialer

□ All ICT Controllers support IP monitoring onboard

□ SIA is supported on all ICT Controllers with onboard dialer

□ All of the above

Which of the following things can Contact ID transmit?

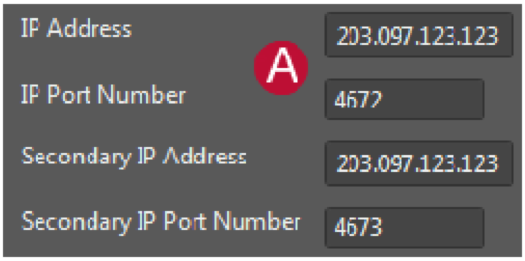
□ The account number that identifies the site

□ The type of event that has occurred

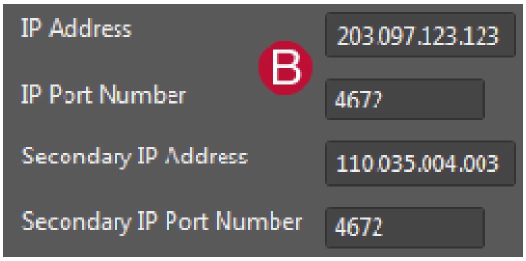
□ The area that the event occurred in

□ All of the above

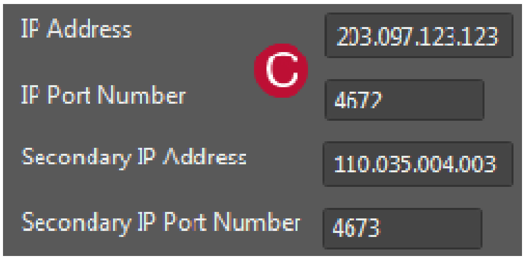
Which of these configuration examples are valid for IP Monitoring?



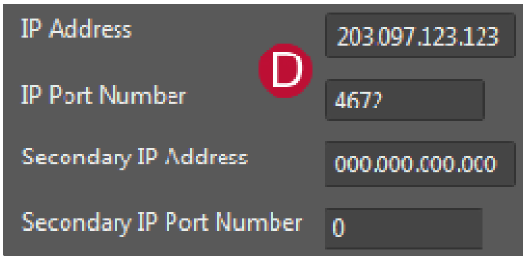
IP Address: 203.097.123.123
IP Port Number: 4672
Secondary IP Address: 203.097.123.123
Secondary IP Port Number: 4673



IP Address: 203.097.123.123
IP Port Number: 4672
Secondary IP Address: 110.035.004.003
Secondary IP Port Number: 4672



IP Address: 203.097.123.123
IP Port Number: 4672
Secondary IP Address: 110.035.004.003
Secondary IP Port Number: 4673



IP Address: 203.097.123.123
IP Port Number: 4672
Secondary IP Address: 000.000.000.000
Secondary IP Port Number: 0

- □ They are all valid
- □ A is not valid
- □ B is not valid
- □ D is not valid

Which of the following statements are true for ALL IP Monitoring Protocols?

- □ No copper phone lines required
- □ No copper phone lines required, displays additional, accurate information from site
- □ No copper phone lines required, displays additional, accurate information from site, they are essentially 'always online'
- □ No copper phone lines required, they are essentially 'always online', alarms are transmitted instantly

Module 137: System Commissioning

This module introduces you to the tools available within Protege GX for commissioning a system, how the keypad can be used when carrying out commissioning on site, and outlines the procedure for backing up and restoring a database.

In This Module

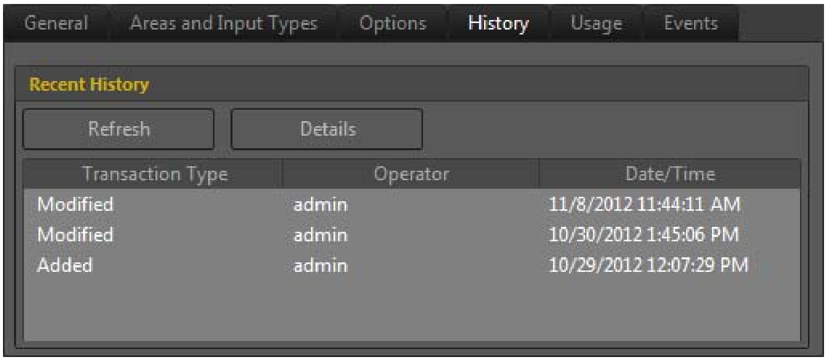
System Commissioning Tools

Protege GX has a number of built in features that can be used when commissioning a system.

Item History

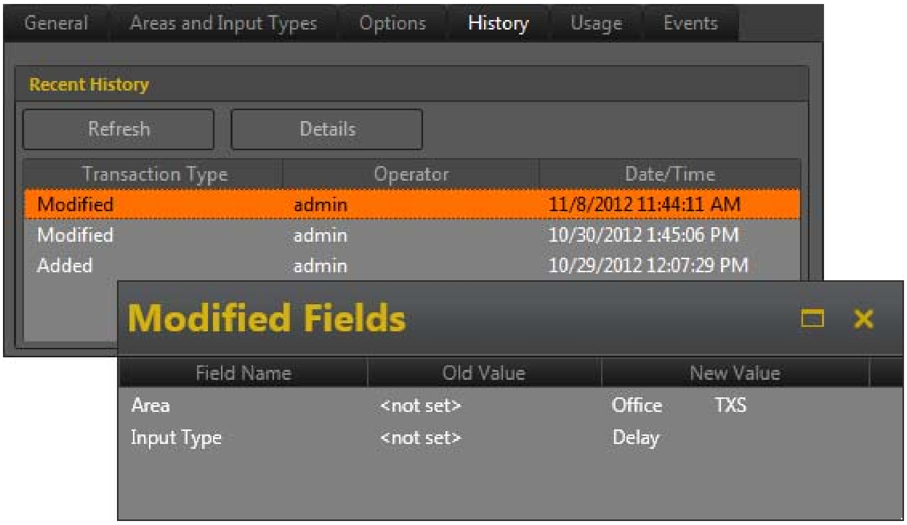
All programmable items in Protege GX have a **History** tab.

This tab shows the audit trail for the currently selected item, including **who** made a change to the programming and **when**. This can be very useful in tracking down why something that was working has stopped working.



Transaction Type	Operator	Date/Time
Modified	admin	11/8/2012 11:44:11 AM
Modified	admin	10/30/2012 1:45:06 PM
Added	admin	10/29/2012 12:07:29 PM

The History tab also shows details of **what** was changed. Highlight the change and click **Details**.



Transaction Type	Operator	Date/Time
Modified	admin	11/8/2012 11:44:11 AM
Modified	admin	10/30/2012 1:45:06 PM
Added	admin	10/29/2012 12:07:29 PM

Modified Fields

Field Name	Old Value	New Value
Area	<not set>	Office TXS
Input Type	<not set>	Delay

Both the old and new values are logged.

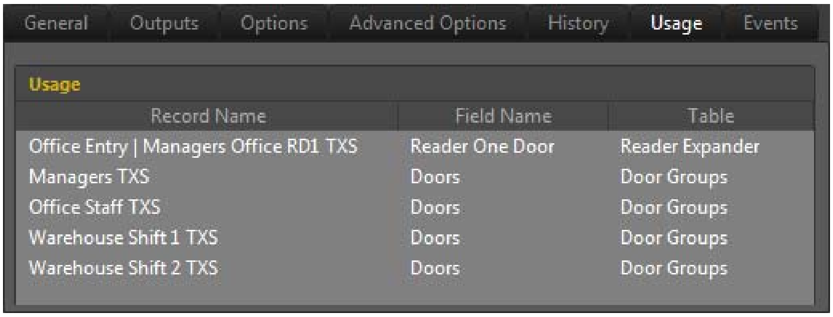
Where multiple changes were made in a single operation, these will be logged as one change.

The history tab currently only logs the changed values where the field contains a single value. Where there are multiple values, such as doors in a door group, the values are not logged only the fact that **something** was modified is logged.

Item Usage

Another useful feature for troubleshooting and commissioning is the **Usage** tab.

This tab shows **how** a particular item **links** to other items. For example, the usage tab on a door will show which reader expander the door is linked to, and which door groups the door currently belongs to.

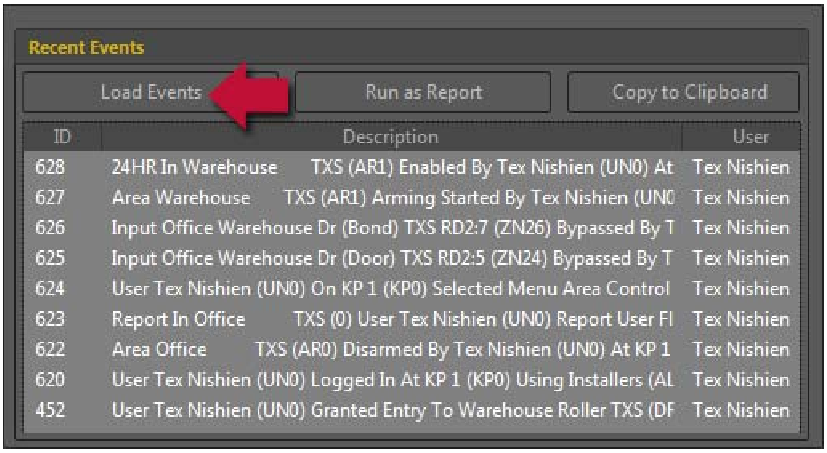


Record Name	Field Name	Table
Office Entry | Managers Office RD1 TXS	Reader One Door	Reader Expander
Managers TXS	Doors	Door Groups
Office Staff TXS	Doors	Door Groups
Warehouse Shift 1 TXS	Doors	Door Groups
Warehouse Shift 2 TXS	Doors	Door Groups

- Use the usage tab on an **area** to show
  - Which inputs are in an area
  - Which doors are associated with an area
  - Which area groups an area belongs to
- Use the usage tab on a **schedule** to show which items follow that particular schedule.
- Use the usage tab on an **access level** to show which users are currently assigned that access Level.
- Use the usage tab on an **output** to show items that can potentially control the output.

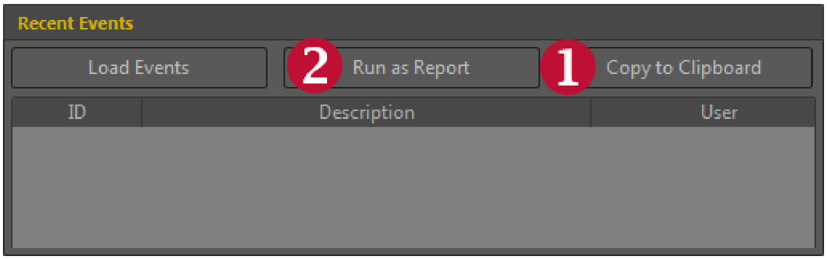
Loading Events

When testing or troubleshooting a particular item, it is quite common to want to see **what** it has been doing recently. Every device that can generate an Event has an **Events** tab. Clicking on the **Load Events** button will load the most recent events that were generated by the selected item.



ID	Description	User
628	24HR In Warehouse TXS (AR1) Enabled By Tex Nishien (UN0) At	Tex Nishien
627	Area Warehouse TXS (AR1) Arming Started By Tex Nishien (UN0	Tex Nishien
626	Input Office Warehouse Dr (Bond) TXS RD2:7 (ZN26) Bypassed By T	Tex Nishien
625	Input Office Warehouse Dr (Door) TXS RD2:5 (ZN24) Bypassed By T	Tex Nishien
624	User Tex Nishien (UN0) On KP 1 (KP0) Selected Menu Area Control	Tex Nishien
623	Report In Office TXS (0) User Tex Nishien (UN0) Report User Fl	Tex Nishien
622	Area Office TXS (AR0) Disarmed By Tex Nishien (UN0) At KP 1	Tex Nishien
620	User Tex Nishien (UN0) Logged In At KP 1 (KP0) Using Installers (AL	Tex Nishien
452	User Tex Nishien (UN0) Granted Entry To Warehouse Roller TXS (DF	Tex Nishien

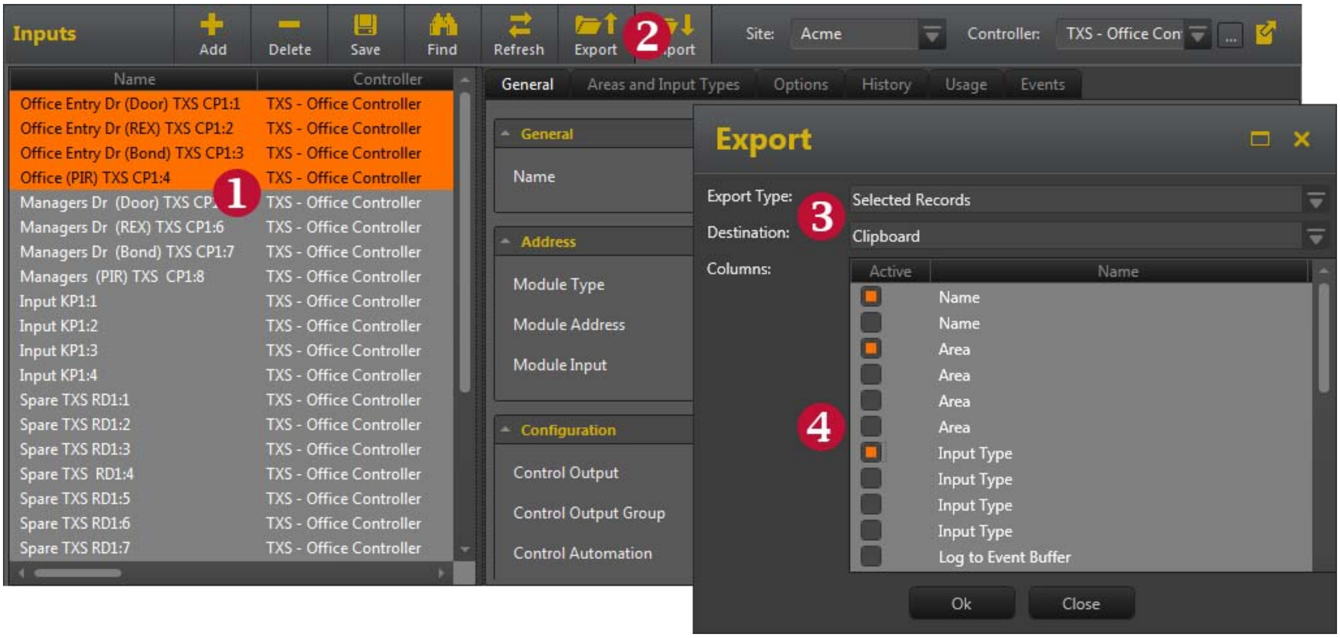
- Use this on a **user** to quickly see what that user has been doing recently.
- Use this on a **door** to quickly see what caused that door to open.
- Use this on an **input** to see when and how often it opened.
- Use this on an **area** to find out when and who armed or disarmed it.
- Use this on an **output** to find out what and when it was turned on or off.



1. The loaded events can then be copied to the Windows clipboard to quickly paste into an email, or to save to a text document to include in commissioning reports.
2. Click the Run as Report button to run this list of events as a report. Reports are covered in more detail shortly...

The Export Tool

Another useful tool for commission documents is the Export tool. The Export tool enables you to extract selected information to the Windows clipboard or to a file in CSV format. The CSV format can be opened in Microsoft Excel, allowing this information to be easily included in commissioning documents.



Name	Controller
Office Entry Dr (Door) TXS CP1:1	TXS - Office Controller
Office Entry Dr (REX) TXS CP1:2	TXS - Office Controller
Office Entry Dr (Bond) TXS CP1:3	TXS - Office Controller
Office (PIR) TXS CP1:4	TXS - Office Controller
Managers Dr (Door) TXS CP	TXS - Office Controller
Managers Dr (REX) TXS CP1:6	TXS - Office Controller
Managers Dr (Bond) TXS CP1:7	TXS - Office Controller
Managers (PIR) TXS CP1:8	TXS - Office Controller
Input KP1:1	TXS - Office Controller
Input KP1:2	TXS - Office Controller
Input KP1:3	TXS - Office Controller
Input KP1:4	TXS - Office Controller
Spare TXS RD1:1	TXS - Office Controller
Spare TXS RD1:2	TXS - Office Controller
Spare TXS RD1:3	TXS - Office Controller
Spare TXS RD1:4	TXS - Office Controller
Spare TXS RD1:5	TXS - Office Controller
Spare TXS RD1:6	TXS - Office Controller
Spare TXS RD1:7	TXS - Office Controller

Export

Export Type: Selected Records

Destination: Clipboard

Columns:

Active	Name
☑	Name
□	Name
☑	Area
□	Area
□	Area
□	Area
☑	Input Type
□	Input Type
□	Input Type
□	Input Type
□	Log to Event Buffer

1. Highlight the item(s) you wish to export
2. Click Export
3. Choose the Export Type and Destination

   The Export Type allows you to choose whether to export all the items in the current list, or only the ones you have highlighted.

   The Destination allows you to choose between the Clipboard or a file.
4. Select the information (columns) you want to export and click OK.

   If you've chosen file, you will be prompted for a filename and location to save the file to.

   This file can now be opened in Excel where the data can be formatted and added to the project documentation.

Reports: Event Search

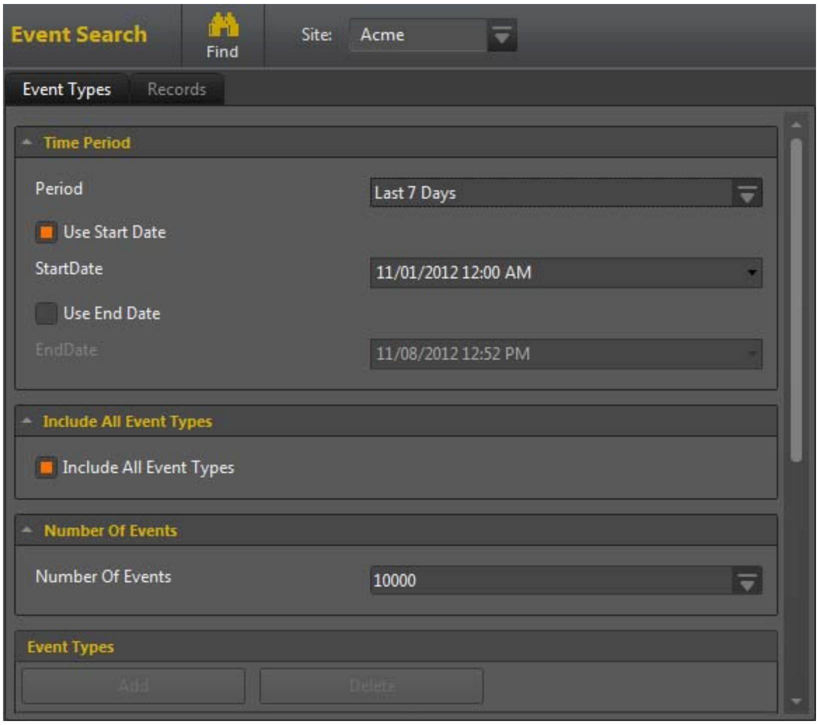
An important function of any access control system is the ability to produce a report on what has happened. There are several ways to achieve this, but in this qualification we will just be looking at the Event Search function.

1. Navigate to Events | Event Search
2. Select the Time Period you wish to include events from

   Choose from the available list of common timeframes or enter a specific start and end date
3. Click Find

   A report is generated showing all events for the selected period

   - Use the Next and Previous buttons to navigate through the pages of the report
   - Use the Print button to open the Print Preview window where you can print, export, or - if an SMTP Server has been configured - email the results



Event Search

Site: Acme

Event Types | Records

Time Period

Period: Last 7 Days

☑ Use Start Date

StartDate: 11/01/2012 12:00 AM

☐ Use End Date

EndDate: 11/08/2012 12:52 PM

Include All Event Types

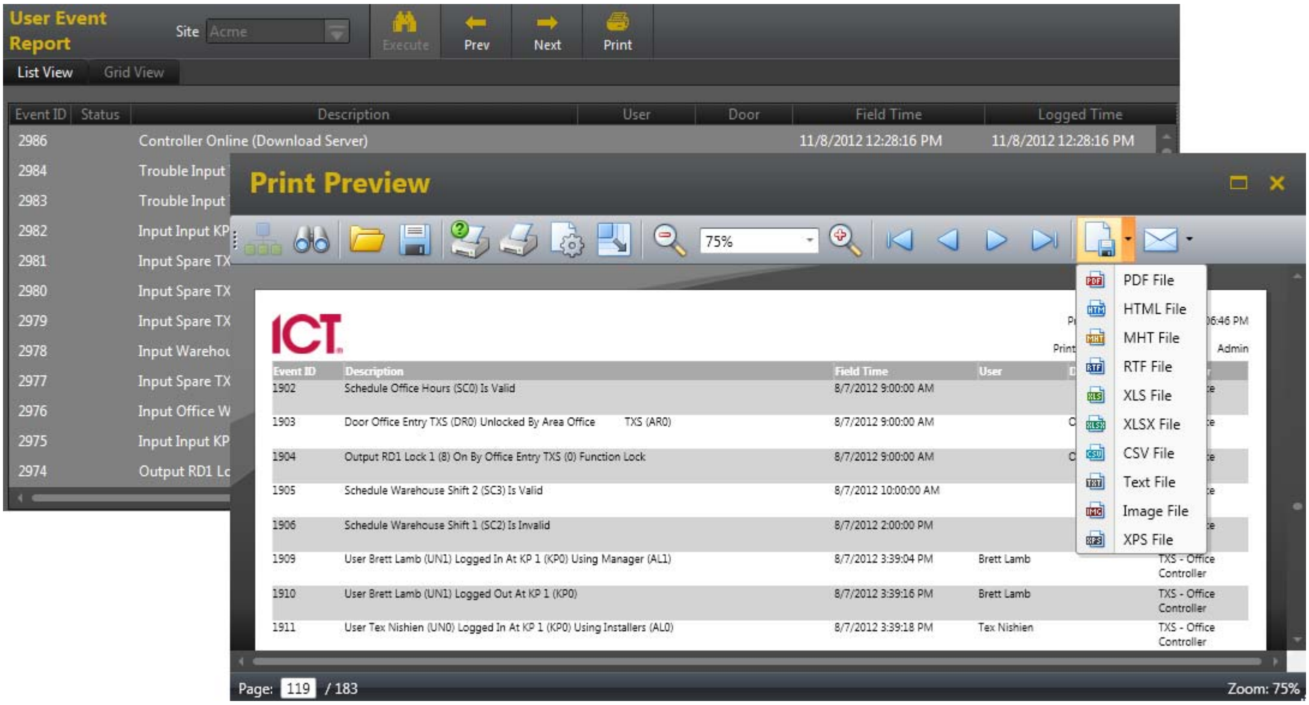
☑ Include All Event Types

Number Of Events

Number Of Events: 10000

Event Types

Export format options include: PDF, HTML, MHT, RTF, XLS, XLSX, CSV, Text, Image, or XPS.



User Event Report

Site: Acme

List View | Grid View

Event ID	Status	Description	User	Door	Field Time	Logged Time
2986		Controller Online (Download Server)			11/8/2012 12:28:16 PM	11/8/2012 12:28:16 PM
2984		Trouble Input				
2983		Trouble Input				
2982		Input Input KP				
2981		Input Spare TX				
2980		Input Spare TX				
2979		Input Spare TX				
2978		Input Warehou				
2977		Input Spare TX				
2976		Input Office W				
2975		Input Input KP				
2974		Output RD1 Lc				

Print Preview

75%

Event ID	Description	Field Time	User
1902	Schedule Office Hours (SC0) Is Valid	8/7/2012 9:00:00 AM	
1903	Door Office Entry TXS (DR0) Unlocked By Area Office TXS (AR0)	8/7/2012 9:00:00 AM	
1904	Output RD1 Lock 1 (8) On By Office Entry TXS (0) Function Lock	8/7/2012 9:00:00 AM	
1905	Schedule Warehouse Shift 2 (SC3) Is Valid	8/7/2012 10:00:00 AM	
1906	Schedule Warehouse Shift 1 (SC2) Is Invalid	8/7/2012 2:00:00 PM	
1909	User Brett Lamb (UN1) Logged In At KP 1 (KP0) Using Manager (AL1)	8/7/2012 3:39:04 PM	Brett Lamb
1910	User Brett Lamb (UN1) Logged Out At KP 1 (KP0)	8/7/2012 3:39:16 PM	Brett Lamb
1911	User Tex Nishien (UN0) Logged In At KP 1 (KP0) Using Installers (AL0)	8/7/2012 3:39:18 PM	Tex Nishien

TXS - Office Controller

Page: 119 / 183

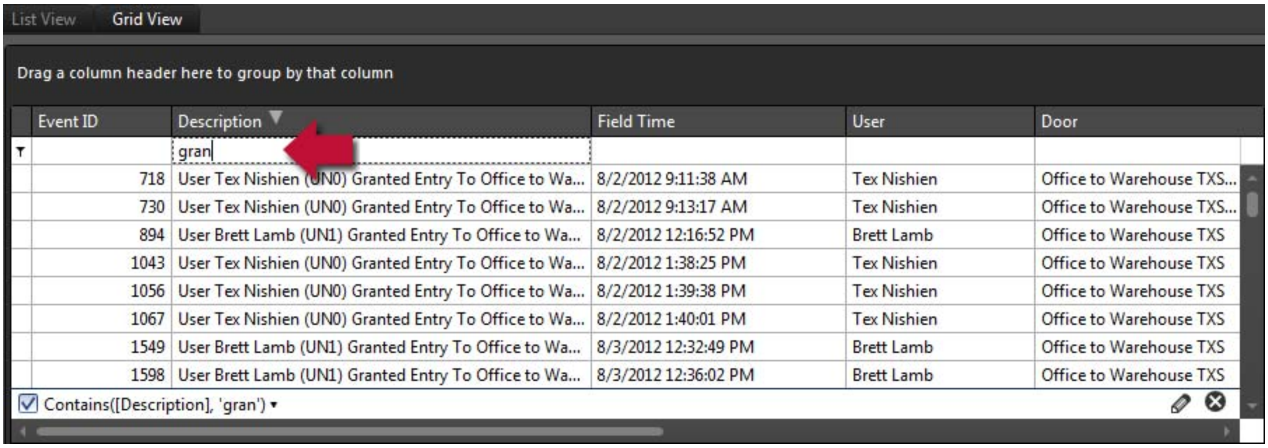
Zoom: 75%

Most often though, you are looking for a particular event or sequence of events. This is where the WYSIWYG Grid View reporting tool comes in...

Using Grid View

The **Grid View** enables you to easily sort and filter the report results.

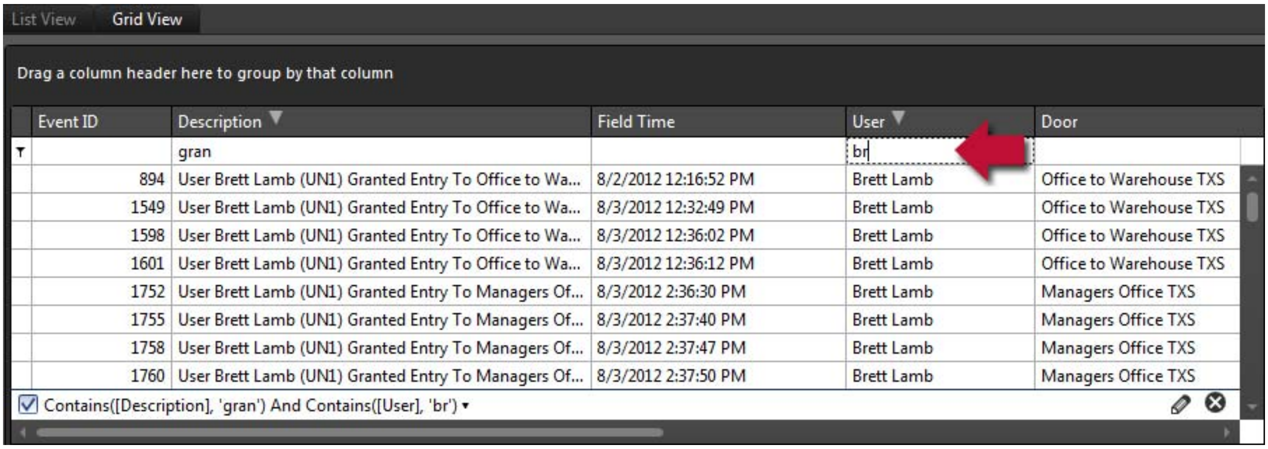
Click in any of the empty fields at the top of the list and start typing what you are looking for. For instance, type **gran** into the description field and the event list will be filtered to show only **Granted** events:



Event ID	Description	Field Time	User	Door
	gran			
718	User Tex Nishien (UN0) Granted Entry To Office to Wa...	8/2/2012 9:11:38 AM	Tex Nishien	Office to Warehouse TXS...
730	User Tex Nishien (UN0) Granted Entry To Office to Wa...	8/2/2012 9:13:17 AM	Tex Nishien	Office to Warehouse TXS...
894	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/2/2012 12:16:52 PM	Brett Lamb	Office to Warehouse TXS
1043	User Tex Nishien (UN0) Granted Entry To Office to Wa...	8/2/2012 1:38:25 PM	Tex Nishien	Office to Warehouse TXS
1056	User Tex Nishien (UN0) Granted Entry To Office to Wa...	8/2/2012 1:39:38 PM	Tex Nishien	Office to Warehouse TXS
1067	User Tex Nishien (UN0) Granted Entry To Office to Wa...	8/2/2012 1:40:01 PM	Tex Nishien	Office to Warehouse TXS
1549	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/3/2012 12:32:49 PM	Brett Lamb	Office to Warehouse TXS
1598	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/3/2012 12:36:02 PM	Brett Lamb	Office to Warehouse TXS

☑ Contains([Description], 'gran') ▾

The results can be even further refined by adding additional filters. For example, if we now type the letters **br** into the User field we will only see Granted events for Brett Lamb:



Event ID	Description	Field Time	User	Door
	gran		br	
894	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/2/2012 12:16:52 PM	Brett Lamb	Office to Warehouse TXS
1549	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/3/2012 12:32:49 PM	Brett Lamb	Office to Warehouse TXS
1598	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/3/2012 12:36:02 PM	Brett Lamb	Office to Warehouse TXS
1601	User Brett Lamb (UN1) Granted Entry To Office to Wa...	8/3/2012 12:36:12 PM	Brett Lamb	Office to Warehouse TXS
1752	User Brett Lamb (UN1) Granted Entry To Managers Of...	8/3/2012 2:36:30 PM	Brett Lamb	Managers Office TXS
1755	User Brett Lamb (UN1) Granted Entry To Managers Of...	8/3/2012 2:37:40 PM	Brett Lamb	Managers Office TXS
1758	User Brett Lamb (UN1) Granted Entry To Managers Of...	8/3/2012 2:37:47 PM	Brett Lamb	Managers Office TXS
1760	User Brett Lamb (UN1) Granted Entry To Managers Of...	8/3/2012 2:37:50 PM	Brett Lamb	Managers Office TXS

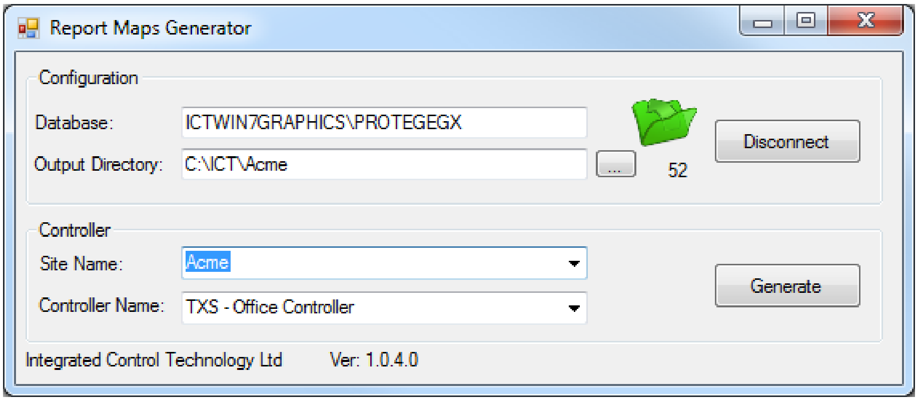
☑ Contains([Description], 'gran') And Contains([User], 'br') ▾

If the report is printed now, it will only include the filtered results as shown on screen.

CID Reporting Tool

You'll often need to supply the offsite monitoring station with a Contact ID Report Map. The Report Map Generator enables you to easily produce this report from a Protege GX system. This is included on the Training USB Card or can be downloaded from the ICT website.

1. Double click the **Report Map.exe** to launch the Report Map Generator:



Report Maps Generator

Configuration

Database: ICTWIN7GRAPHICS\PROTEGEGX

Output Directory: C:\ICT\Acme

52

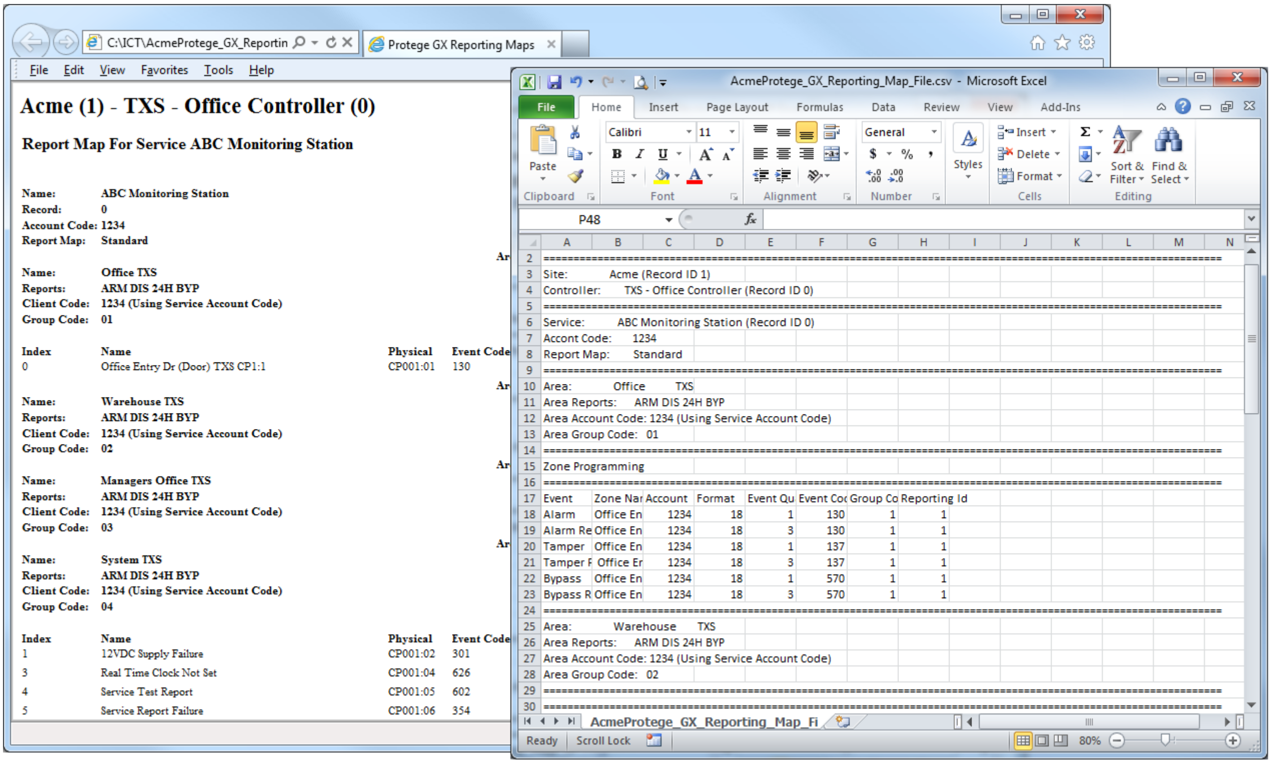
Controller

Site Name: Acme

Controller Name: TXS - Office Controller

Integrated Control Technology Ltd Ver: 1.0.4.0

2. Enter the **Database** connection details. Provided you selected the defaults during installation, this will be the name of your server and ProtegeGX (where ProtegeGX is the SQL instance).
3. Click **Connect**. If connection is successful, a green folder appears and the version of the database is shown below.
4. Select the **Output Directory** where the report will to be saved to.
5. Select the **Site Name** and **Controller** to produce the report for, then click **Generate**.
6. Browse to the output folder and open the resulting HTML or CSV files. Print and send this to the monitoring station.



C:\ICT\AcmeProtege_GX_Reportin

Protege GX Reporting Maps

Acme (1) - TXS - Office Controller (0)

Report Map For Service ABC Monitoring Station

Name: ABC Monitoring Station
Record: 0
Account Code: 1234
Report Map: Standard

Name: Office TXS
Reports: ARM DIS 24H BYP
Client Code: 1234 (Using Service Account Code)
Group Code: 01

Index	Name	Physical	Event Code
0	Office Entry Dr (Door) TXS CP1:1	CP001:01	130

Name: Warehouse TXS
Reports: ARM DIS 24H BYP
Client Code: 1234 (Using Service Account Code)
Group Code: 02

Name: Managers Office TXS
Reports: ARM DIS 24H BYP
Client Code: 1234 (Using Service Account Code)
Group Code: 03

Name: System TXS
Reports: ARM DIS 24H BYP
Client Code: 1234 (Using Service Account Code)
Group Code: 04

Index	Name	Physical	Event Code
1	12VDC Supply Failure	CP001:02	301
3	Real Time Clock Not Set	CP001:04	626
4	Service Test Report	CP001:05	602
5	Service Report Failure	CP001:06	354

AcmeProtege_GX_Reporting_Map_File.csv - Microsoft Excel

P48

	A	B	C	D	E	F	G	H
2	==============================							
3	Site: Acme (Record ID 1)							
4	Controller: TXS - Office Controller (Record ID 0)							
5	==============================							
6	Service: ABC Monitoring Station (Record ID 0)							
7	Accont Code: 1234							
8	Report Map: Standard							
9	==============================							
10	Area: Office TXS							
11	Area Reports: ARM DIS 24H BYP							
12	Area Account Code: 1234 (Using Service Account Code)							
13	Area Group Code: 01							
14	==============================							
15	Zone Programming							
16	==============================							
17	Event	Zone Nar	Account	Format	Event Qu	Event Coc	Group Co	Reporting Id
18	Alarm	Office En	1234	18	1	130	1	1
19	Alarm Re	Office En	1234	18	3	130	1	1
20	Tamper	Office En	1234	18	1	137	1	1
21	Tamper F	Office Er	1234	18	3	137	1	1
22	Bypass	Office En	1234	18	1	570	1	1
23	Bypass R	Office En	1234	18	3	570	1	1
24	==============================							
25	Area: Warehouse TXS							
26	Area Reports: ARM DIS 24H BYP							
27	Area Account Code: 1234 (Using Service Account Code)							
28	Area Group Code: 02							
29	==============================							
30	==============================							

AcmeProtege_GX_Reporting_Map_Fi

Keypad Testing

Protege GX is a server based system, and as such, very little programming can be carried out at the keypad. Essentially, the Controller's IP settings are the only things that can be programmed at the keypad. The keypad is still however, a valuable tool when carrying out commissioning on site.

We are going to look more in depth at the Events Menu (3) and Installer Menu (4).

Events Menu

- Log in with the installer code.
- Press ⧉ [3] [1]

  This takes you to the Events Review menu which displays all events stored on the Controller, starting with the most recent event.
- To move backwards through the event review, push the ▼ key.
- To move forwards through the event review, push the ▲ key.

  When you reach the most recent event, the keypad will show

```
Start of events
reached.
```

- Pressing the ▼ key at this point takes you back to the last event that you viewed.
- Pressing the ▲ key will then show any new events that have occurred.

The maximum text length of an event is 64 characters, but as the keypad can only display 16 characters per line, events may be split over 4 lines. By default, lines one and two are displayed on the keypad.

- Press the ▶ key to display lines 2 and 3.
- Press the ▶ key again to scroll to lines 3 and 4.

  Moving up and down through the events will continue to display the same lines, so if you are currently viewing lines 2 and 3 of an event and press the ▼ key, lines 2 and 3 of the **next** event are displayed.
- Use the ◀ key to move back up through the lines being displayed.

Input View Menu

- Log in with the installer code.
- Press ⧉ [4] [1] [1]. This takes you to the Input View menu allowing you to view the current state of an input.

```
Select zone to
view: 000000--
```

- You will be prompted to enter an input number. This number refers to the order the input is stored at the Controller and doesn't relate to the server database.

  You can either type in a number, or use the ▲ and ▼ keys to scroll through the available inputs.

- Press ⏎ to select an input.

  Pressing ⏎ while the display shows all 0s will display the first input on the Controller (usually Input 1 on the Controller).

- The first line displays the first 16 characters of the input name as recorded at the server.
- The second line shows the current state.

```
Office Entry Dr
is CLOSED
```

  Note: This display is dynamic and updates in real time as the input changes state.

- Press the ▲ and ▼ keys to cycle through the inputs.
- Press the 🔒 key to switch between Input name and Input address

```
CP001:01 Zone
is CLOSED
```

- Press the ◀ key to return to the input number selection screen.

Trouble Input View Menu

Press ⧉ [4] [1] [2]. The Trouble Input View menu allows you to view the current state of a trouble input.

```
Trouble zone to
view: 000000-
```

As with the Input View menu, you'll be prompted to enter a trouble input number. This number refers to the order the trouble input is stored at the Controller and doesn't relate to the server database.

Navigation is carried out in the same way as with inputs.

Output View Menu

Press ⧉ [4] [1] [3]. This takes you to the Output View menu allowing you to view the current state of an output.

```
Select PGM to
view: 000000
```

- As with the previous menus, you'll be prompted to enter an output number.
- Navigation is carried out in the same manner.

Outputs can also be **controlled** from this menu. You'll notice that the [1] key has the word ON next to it and the [2] key has OFF next to it.

- Pressing the [1] key will turn the output ON.

```
CP001: Bell 0
is ON
```

- Pressing the [2] key will turn the output OFF.

```
CP001: Bell 0
is OFF
```

Door View Menu

Press ⧉ [4] [1] [4]. This takes you to the Door View menu allowing you to view the current state of a door.

```
Select Door to
view: DR000000
```

- As with the previous menus, you'll be prompted to enter a door number.
- Navigation is carried out in the same manner.

Doors can also be controlled from this menu.

- Pressing the [1] key will send an unlock by menu command to the door. This will unlock the door for the same period as a card badge or REX input would (5 seconds by default).

```
Office Entry TXS
(Closed)(Menu  )
```

- After the time expires, the door locks again.

```
Office Entry TXS
(Closed)(Locked)
```

You'll notice that the [3] key has the word LAT next to it. This is short for LATCH.

- Pressing the [3] key will latch unlock the door.

```
Office Entry TXS
(Closed)(Latch )
```

- The door will now stay unlocked until another lock command is issued, such as when a schedule changes.
- Press the [2] key (OFF) to lock the door again.

```
Office Entry TXS
(Closed)(Locked)
```

Bypassing Inputs

Press ⧉ BYPASS to access the Bypass Input menu.

- Navigate and select inputs in the same manner as other menus. The display will show the current bypass state of the input.

```
Office Entry Dr
is not BYPASSED
```

- If an input is not bypassed, it will function as normal if the area is armed. To bypass an input, press the [1] key (ON).

```
Office Entry Dr
is BYPASSED
```

The next time an area arms, this input will be ignored and will be able to open and close without activating an alarm.

Note: When the area is next disarmed, the bypass will clear automatically.

- Pressing the [3] key (Latch) will latch bypass the input. This means the input will be ignored and will be able to open and close without activating an alarm.

  ```
  Office Entry Dr
  is BYPASS LATCH
  ```

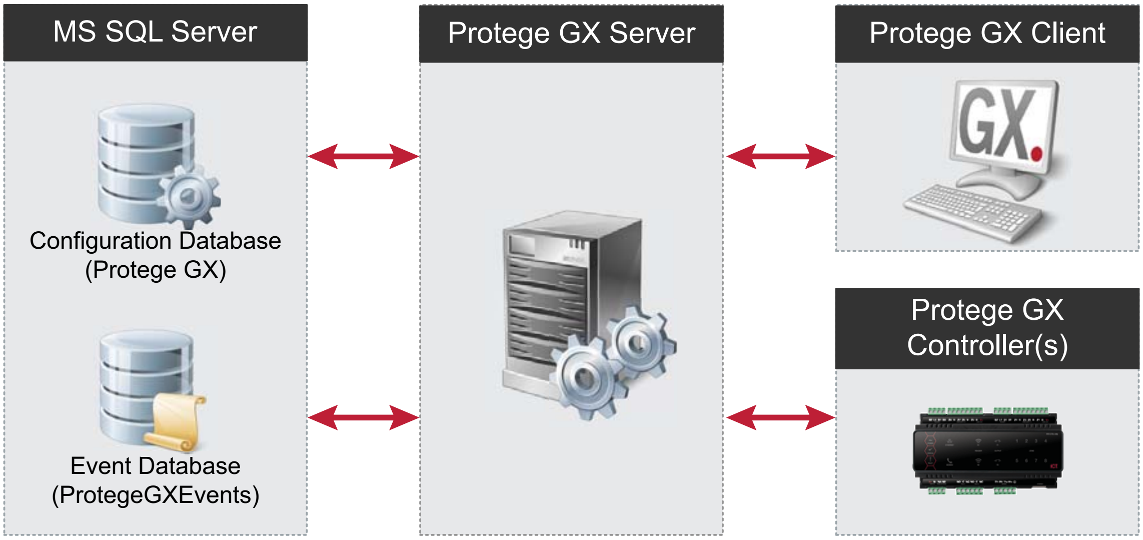
  When the area is next disarmed, a latched bypass will not clear automatically.

- Press the [2] key (OFF) to clear a bypass from an input.

  ```
  Office Entry Dr
  is not BYPASSED
  ```

Backing up and Restoring a Database

The Configuration and Event databases are both Microsoft SQL Server databases. The databases are completely independent from the Protege GX server and user interface. This means the services and software can be completely removed without affecting the configuration or events databases. Similarly, the Protege GX databases can be backed up and restored as required. It is even possible to backup a database from one server and restore it to another server. This is very useful when running a test environment, or for pre-programming a system at your office prior to deployment to the client site.

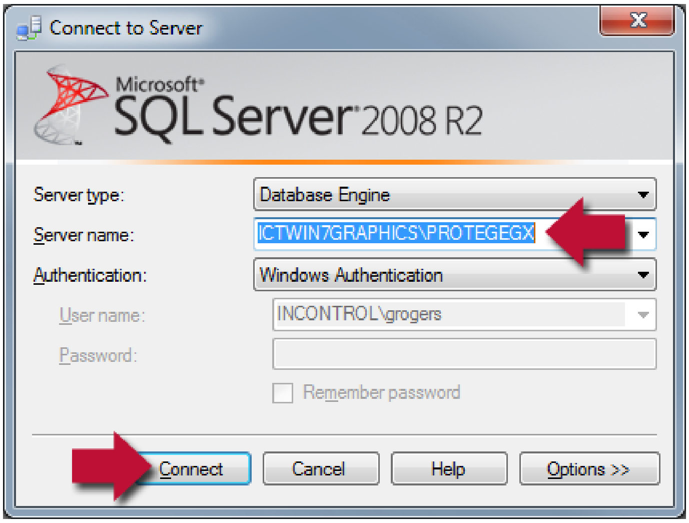


Backing up a Database

- The ProtegeGX Configuration database can be backed up automatically and manually from within the Protege GX software.
- It can also be backed up using Microsoft SQL Server Management Studio.
- The Event database can **only** be backed up using the Management Studio.

To Backup a Database:

1. Open Microsoft SQL Server Management Studio.



Server type: Database Engine

Server name: ICTWIN7GRAPHICS\PROTEGEGX

Authentication: Windows Authentication

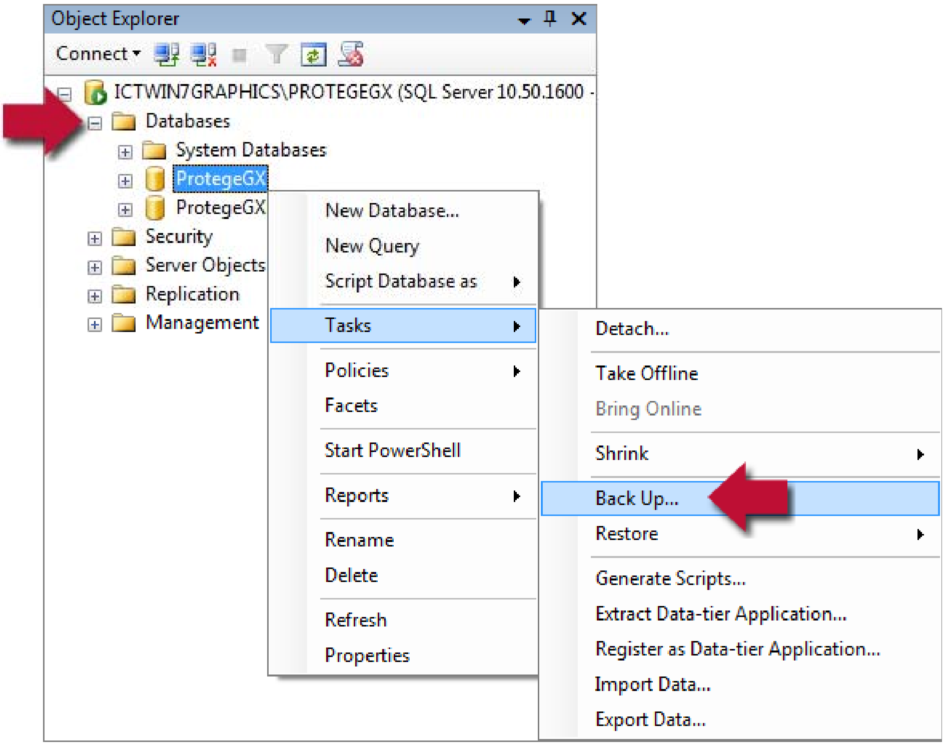
User name: INCONTROL\grogers

Password:

- The first time you connect, you will need to specify the server name. If you accepted the defaults during installation, this will be **COMPUTERNAME\PROTEGEGX** where COMPUTERNAME is the name of the PC that GX is installed on.
- Click **Connect** to continue.

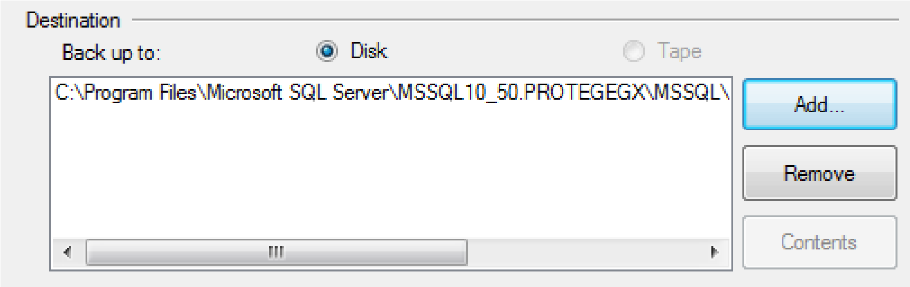
By default, only the Windows user who performed the original installation (using the SQLSetup.exe file from the Protege GX installation package) will have access to the database.

2. Click to expand the **Databases** node in the Object Explorer



3. Right click the ProtegeGX database and select Tasks | Backup…

   If a backup has already been performed, the path is displayed under the destination.



Destination

Back up to: ● Disk ○ Tape

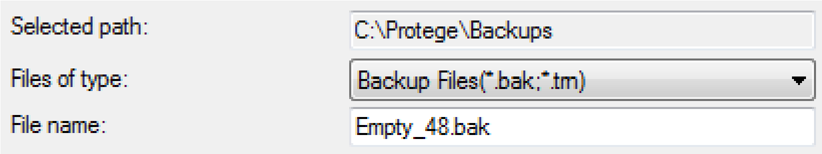
C:\Program Files\Microsoft SQL Server\MSSQL10_50.PROTEGEGX\MSSQL\

   If you don't want to overwrite this file, select it and click Remove.

   By default, if you select a backup file that already exists, the new backup is added to this file. It can still be restored, but care needs to be taken to select the correct backup when restoring.

4. Click Add... to enter the name and location of the backup file.

   Make sure to include the extension .bak in the file name then click OK.



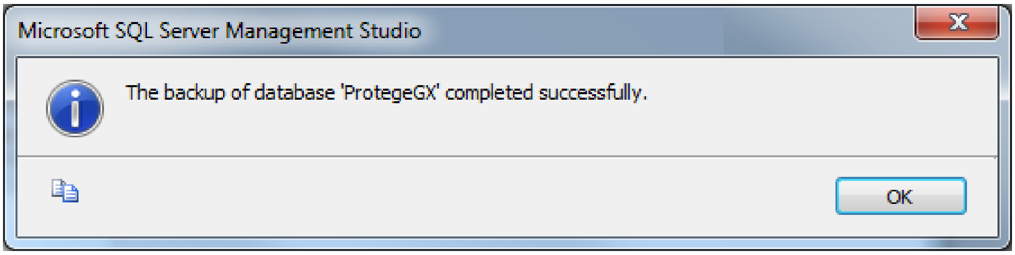
Selected path: C:\Protege\Backups

Files of type: Backup Files(*.bak;*.tm)

File name: Empty_48.bak

5. Click OK to close the Select Backup Destination screen then click OK again to start the backup.

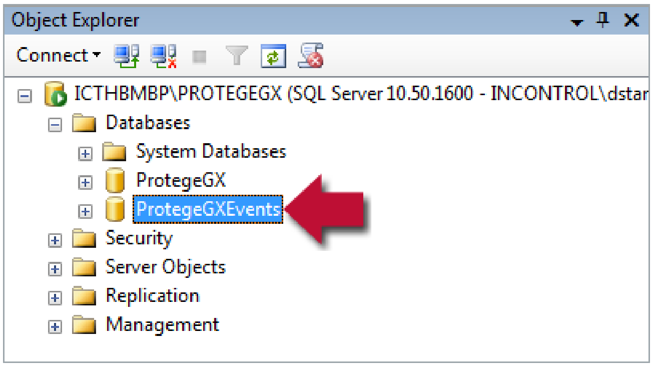
   Progress is shown as the backup completes, and once finished a confirmation message is shown.



Microsoft SQL Server Management Studio

The backup of database 'ProtegeGX' completed successfully.

6. Backing up the events database can be achieved by following the same process, but selecting the ProtegeGXEvents database instead:



Restoring a Database

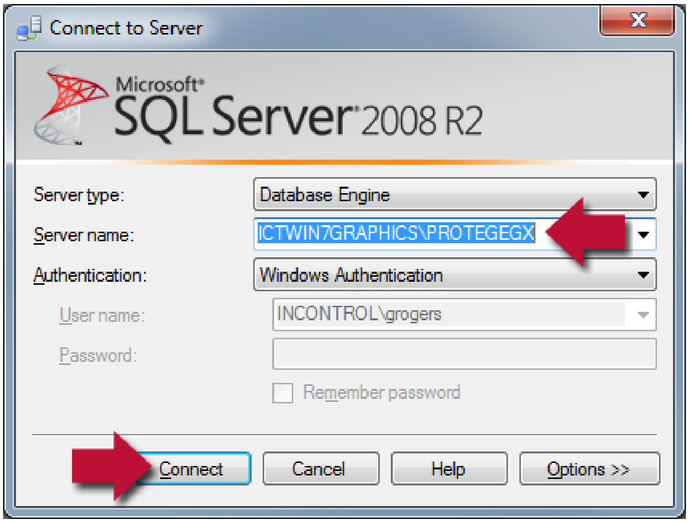
While backups can be performed automatically or manually, and from within the software or from within MSSQL, restoring a database must always be carried out in MSSQL.

Before attempting to restore a database:

- You should always backup your current database first so that you can return to a known point if something goes wrong.
- You must stop the Protege GX Services. This terminates the connection between the database and the Protege GX Services
- When stopping the Protege GX Data Service, the software should also be closed.

To Restore a Database:

1. Open Microsoft SQL Server Management Studio.



Server type: Database Engine

Server name: ICTWIN7GRAPHICS\PROTEGEGX

Authentication: Windows Authentication

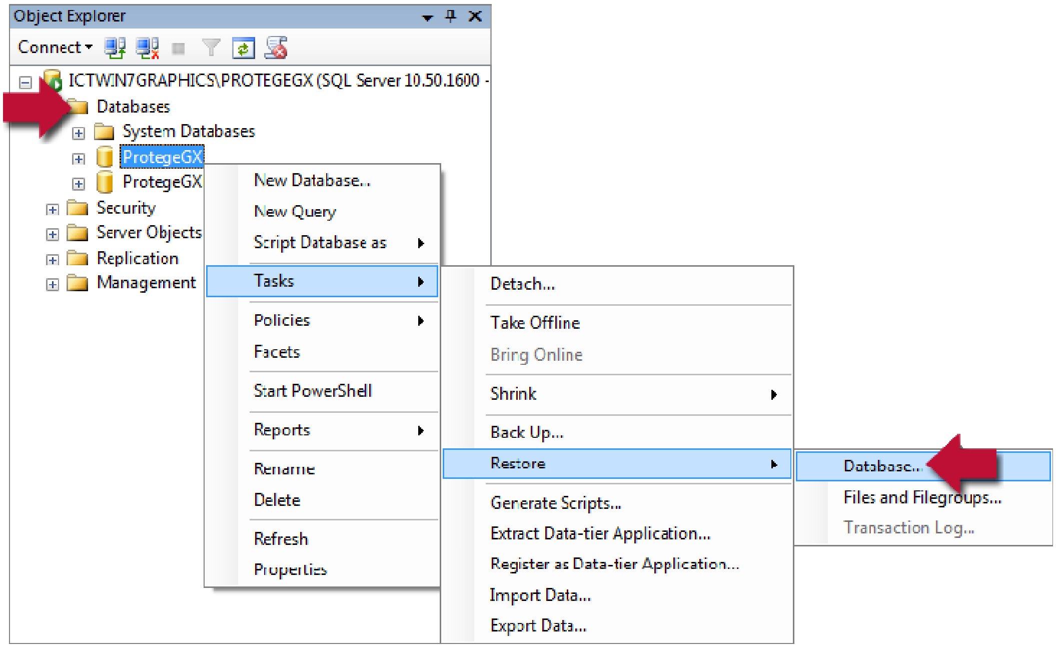
User name: INCONTROL\grogers

Password:

- The first time you connect, you will need to specify the server name. If you accepted the defaults during installation, this will be COMPUTERNAME\PROTEGEGX where COMPUTERNAME is the name of the PC that GX is installed on.
- Click Connect to continue.

By default, only the Windows user who performed the original installation (using the SQLSetup.exe file from the Protege GX installation package) will have access to the database.

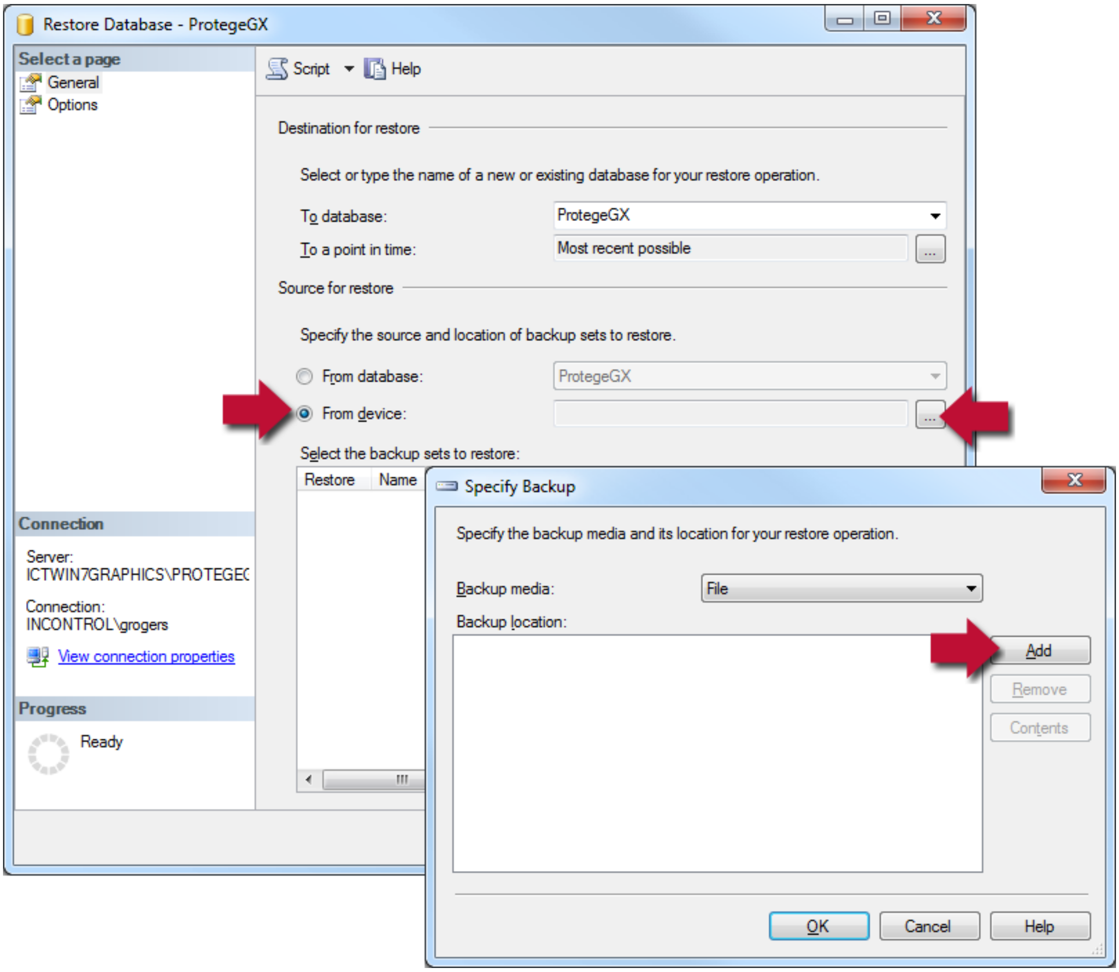
2. Click to expand the **Databases** node in the Object Explorer



3. Right click the **ProtegeGX** database and select **Tasks | Restore | Database…**

4. Under the Source for restore, select **From Device**, then click the **[…]** button.

   The Specify Backup window opens.



Destination for restore

Select or type the name of a new or existing database for your restore operation.

To database: ProtegeGX

To a point in time: Most recent possible

Source for restore

Specify the source and location of backup sets to restore.

○ From database: ProtegeGX

● From device:

Select the backup sets to restore:

Server:
ICTWIN7GRAPHICS\PROTEGEC

Connection:
INCONTROL\grogers

Specify the backup media and its location for your restore operation.

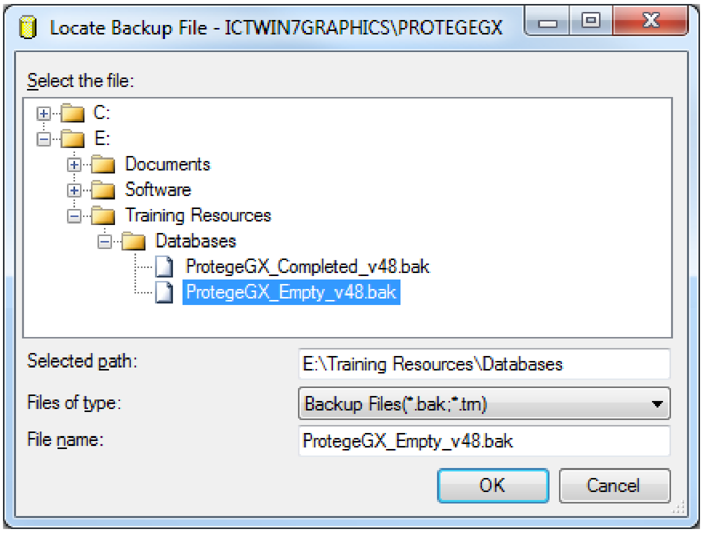
Backup media: File

Backup location:

5. Click **Add** to browse to the backup file to be restored.

   By default, only file with the extension .bak or .tm will be displayed.

6. Browse to the backup file. For this exercise, we are going to restore an empty database which can be found on your USB training card.



Locate Backup File - ICTWIN7GRAPHICS\PROTEGEGX

Select the file:

- C:
- E:
  - Documents
  - Software
  - Training Resources
    - Databases
      - ProtegeGX_Completed_v48.bak
      - ProtegeGX_Empty_v48.bak

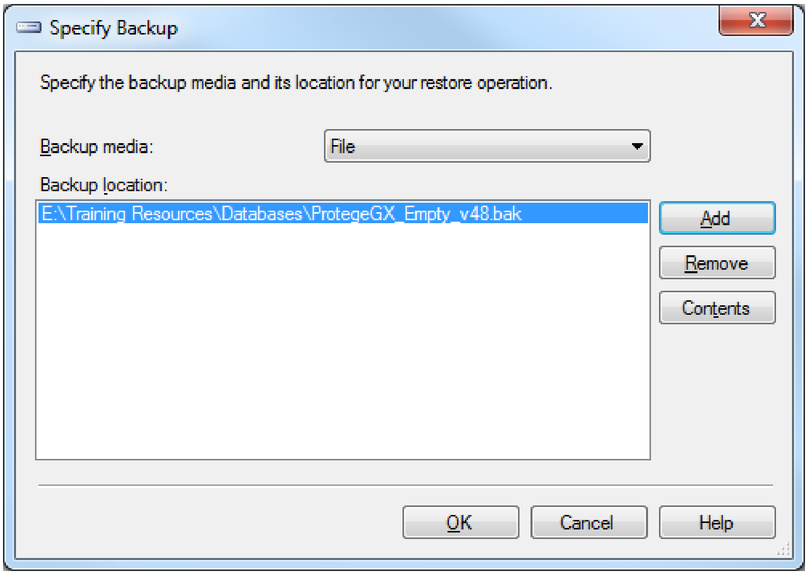
Selected path: E:\Training Resources\Databases

Files of type: Backup Files(*.bak;*.tm)

File name: ProtegeGX_Empty_v48.bak

Take note of the version number which is shown in the file name then click **OK**.

7. You'll see that the file has been added as a backup path. Click **OK**.



Specify Backup

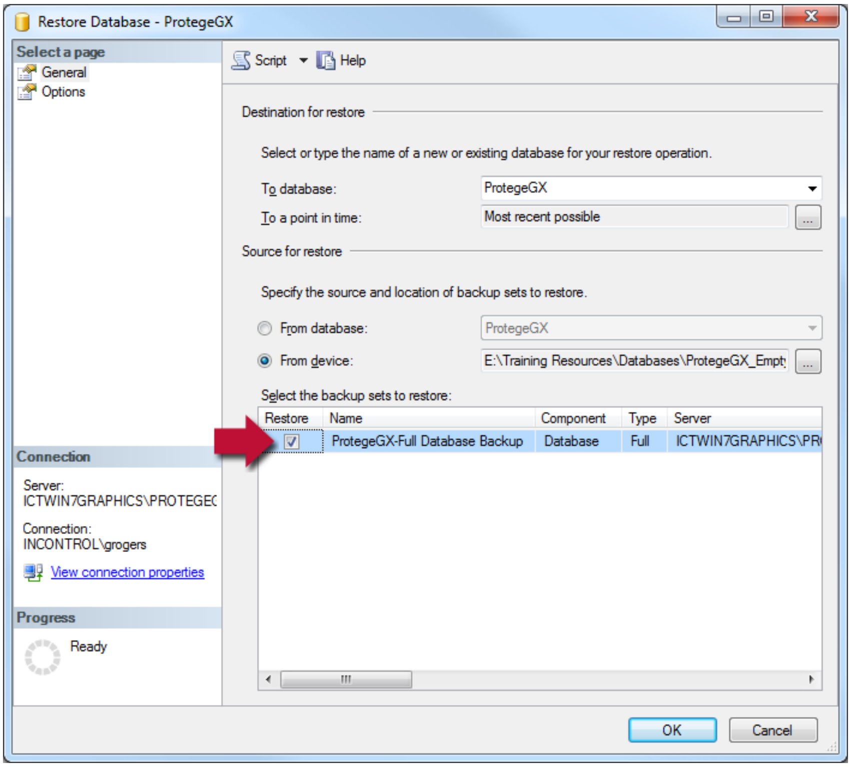
Specify the backup media and its location for your restore operation.

Backup media: File

Backup location:

E:\Training Resources\Databases\ProtegeGX_Empty_v48.bak

8. You should now have the backup file listed under the backup sets to restore. Select (enable) the **Restore** check box beside the backup set.



Restore Database - ProtegeGX

Destination for restore

Select or type the name of a new or existing database for your restore operation.

To database: ProtegeGX

To a point in time: Most recent possible

Source for restore

Specify the source and location of backup sets to restore.

○ From database: ProtegeGX

● From device: E:\Training Resources\Databases\ProtegeGX_Empt

Select the backup sets to restore:

Restore	Name	Component	Type	Server
☑	ProtegeGX-Full Database Backup	Database	Full	ICTWIN7GRAPHICS\PR

Connection

Server:
ICTWIN7GRAPHICS\PROTEGE(

Connection:
INCONTROL\grogers

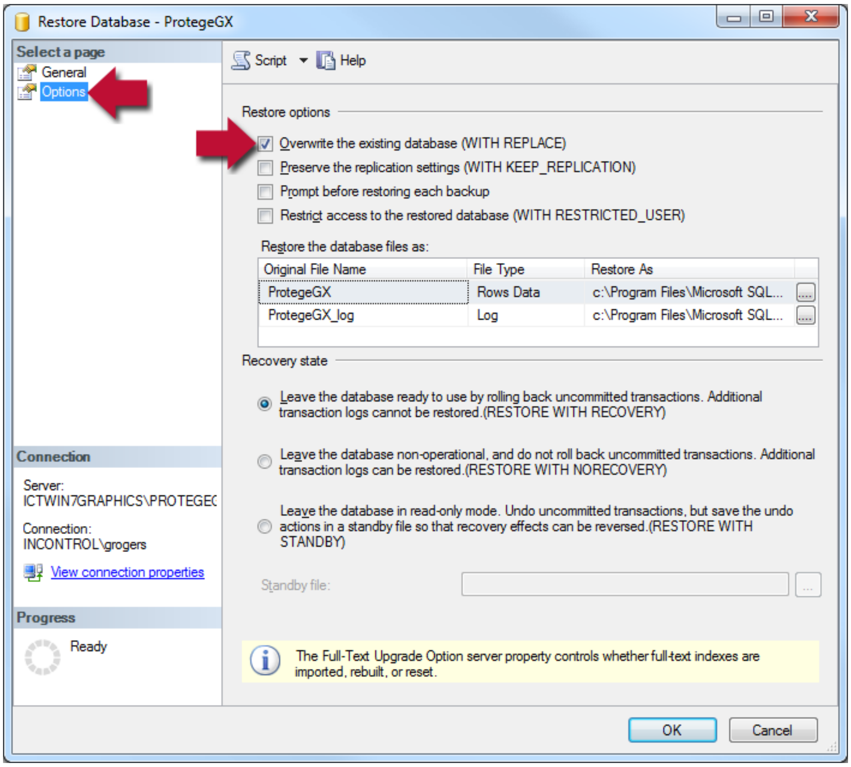
View connection properties

Progress

Ready

When performing a backup, if the file already exists, SQL appends the backup to the same file as an additional backup set. If multiple backup sets are shown, select the set with the most recent date.

9. Click the **Options** page and ensure the Restore options are set to **Overwrite the existing database**.



Restore Database - ProtegeGX

Restore options

☑ Overwrite the existing database (WITH REPLACE)

☐ Preserve the replication settings (WITH KEEP_REPLICATION)

☐ Prompt before restoring each backup

☐ Restrict access to the restored database (WITH RESTRICTED_USER)

Restore the database files as:

Original File Name	File Type	Restore As
ProtegeGX	Rows Data	c:\Program Files\Microsoft SQL...
ProtegeGX_log	Log	c:\Program Files\Microsoft SQL...

Recovery state

● Leave the database ready to use by rolling back uncommitted transactions. Additional transaction logs cannot be restored.(RESTORE WITH RECOVERY)

○ Leave the database non-operational, and do not roll back uncommitted transactions. Additional transaction logs can be restored.(RESTORE WITH NORECOVERY)

○ Leave the database in read-only mode. Undo uncommitted transactions, but save the undo actions in a standby file so that recovery effects can be reversed.(RESTORE WITH STANDBY)

Standby file:

The Full-Text Upgrade Option server property controls whether full-text indexes are imported, rebuilt, or reset.

Connection

Server:
ICTWIN7GRAPHICS\PROTEGE(

Connection:
INCONTROL\grogers

View connection properties

Progress

Ready

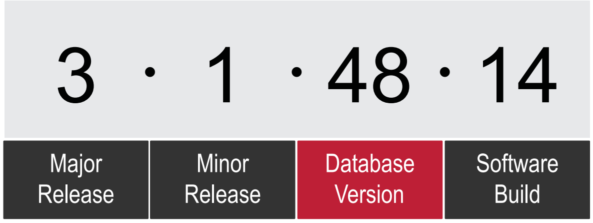
If you don't select this, you will just add the backup set to the end of the existing database which will result in corruption of the database.

10. Click **OK** to start the restore process. Progress is shown as the database is restored.

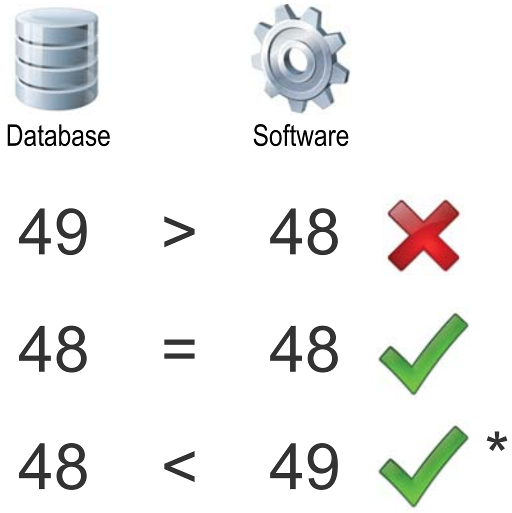
- If the progress wheel doesn't increase, an error message will eventually be displayed. This is usually caused by an open connection to the database, which most occurs when the Protege GX Services haven't been stopped.
- If the database restored successfully and the database version is the same as the software installed, then the services can now be restarted.
- If the ProtegeGX Data service fails to start, there is either a database / software version mismatch, or the restored database is corrupt.
- If the database is corrupt, then your only option is to restore the backup set taken at the beginning of this exercise.

Database Versions

The software version number is broken into 4 sections:



The **Database version** section of this number is extremely important. When this number changes, the structure of the database has changed. If this number doesn't match the version of the database set currently installed, the Protege GX Data Service cannot start.



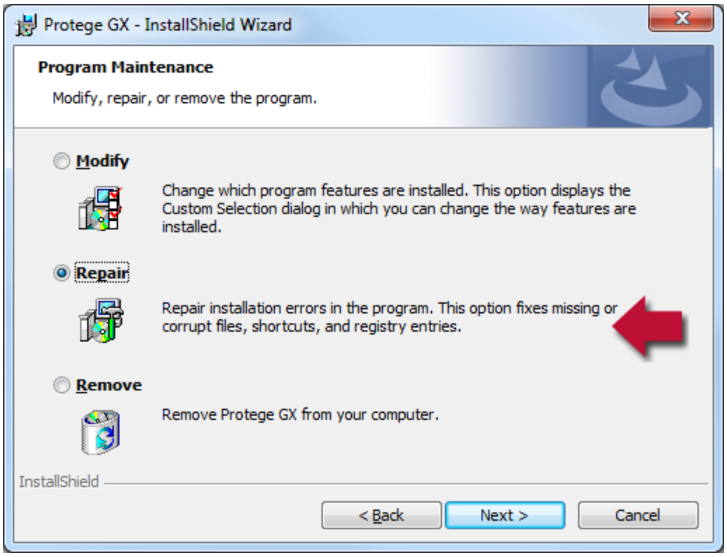
- It is not possible to restore a newer database to an older software version.
- If the version numbers match, the restore should be successful and the Data Service should start.
- If the database being restored is older than the software version, then the installation setup file must be re-run. This will upgrade the structure of the restored database to match the software.

  This is why it is good practice to record the database version in the backup file name.

Upgrading a Database

- If the database needs upgrading, this can be done by running the **Setup.exe** file of the currently installed Protege GX software.

  The software does not need to be uninstalled first, as it will only be used to upgrade the database structure.



Protege GX - InstallShield Wizard

Program Maintenance

Modify, repair, or remove the program.

○ **Modify**

Change which program features are installed. This option displays the Custom Selection dialog in which you can change the way features are installed.

● **Repair**

Repair installation errors in the program. This option fixes missing or corrupt files, shortcuts, and registry entries.

○ **Remove**

Remove Protege GX from your computer.

- Select the **Repair** option when prompted then follow the onscreen instructions.
- The installer will cycle through versions one by one until the database is upgraded to the current version of the software.

If you have made any changes to configuration files (such as Windows security settings) these may be overwritten by the installer and will need to be updated again at the server.

Operator Credentials

The SQL database contains all system configuration, including operator credentials. This means that after a database has been restored, the only valid operator login will be those that were valid at the time of backup.

Having restored the empty database for this exercise, the only valid operator is now **admin** with no password.

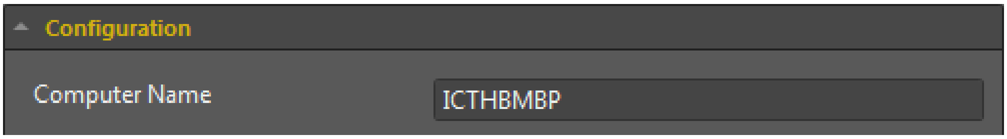
Server Details

Also stored in the configuration database are the details of the Event and Download Server.

If you have restored a database from a different server, the Server names will need to be updated.

- Open Protege GX and navigate to **Global | Event Server**.

  Ensure that the **Computer Name** matches the name of the PC it is installed on.



Configuration

Computer Name: ICTHBMBP

- Navigate to **Global | Download Server**.

  Ensure that the **Computer Name** matches the name of the PC it is installed on.

After updating the Event and Download Server details, you must restart the Protege GX Data Service.

Review Questions

What is the Usage tab used for?

- □ It shows which items are linked to the current item
- □ It shows when a change was made to the current item
- □ It shows the events associated with the current item
- □ It shows which operator made a change to the current item

If an Output was on and I needed to know what turned it on, what would be the best way to figure this out?

- □ Go to the Usage tab of the output
- □ Use the find tool
- □ Run a usage report
- □ Use the 'Load Events' function for the output

What is the best way to take information such as a list of inputs from the Protege GX databases for use in project documentation?

- □ Run a report
- □ Take a screenshot
- □ Use the Export Tool to create a CSV file
- □ Take a database backup

The Protege Keypad can be used for which of the following things?

- □ Viewing events
- □ Viewing events and changing the Controller IP address
- □ Viewing events, changing the Controller IP address and changing PIN codes
- □ Viewing events, changing PIN codes and programming users

Which of the following statments are true for the Protege GX Keypad?

- □ The states of inputs, outputs and doors can be viewed
- □ The states of inputs, outputs and doors can be viewed and doors can be controlled
- □ The states of inputs, outputs and doors can be viewed and outputs can be controlled
- □ All of the above

Can a database that has been backed up from one server be restored to another?

□ Yes, any Protege GX database will work with any Protege GX Server

□ No, it can only be restored to the Server it was taken from

□ Yes, as long as the Server is running the same or newer version

□ Yes, as long as the Server is running the same or older version

How do you upgrade a database after it is restored to a newer Server version?

□ By running the software installer and choosing the repair option

□ It is not possible to restore an older database to a newer Server

□ The upgrade process must be completed using SQL Server Management Studio

□ The software will upgrade the database next time it is run

If a database has been restored from a different server, what additional step or steps must be taken to get the Server running?

□ Restart the PC

□ Change the name of the Event Server and Download Server to match the PC name

□ Run the software installer to upgrade the database

□ Relicense the Server

Module 138: Programming Walkthrough

This module takes you through the practical steps of setting up and testing a system.

In This Module

Programming a System from Start to Finish

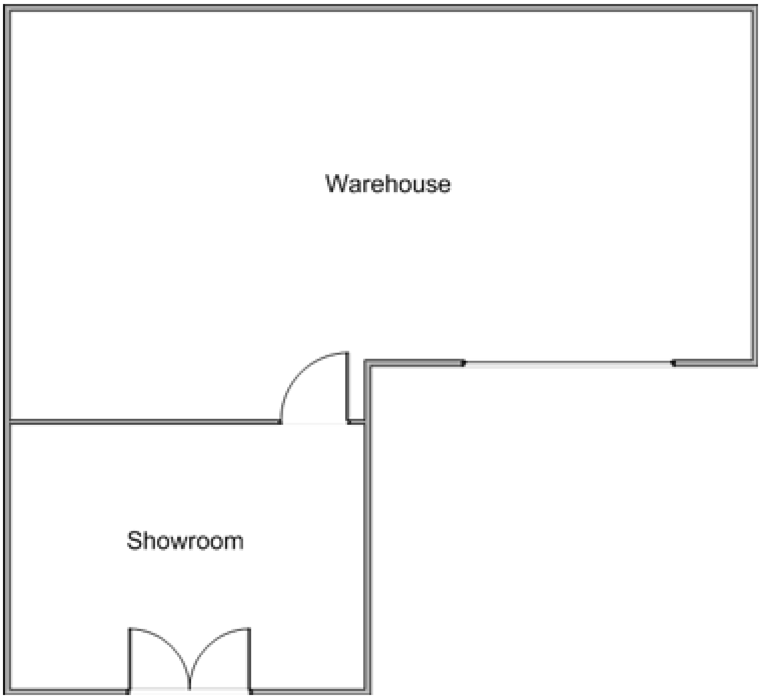
We'll now set up a new scenario to practice what we've learned so far. This will give you an idea of what to expect during the practical element of the certification exam.

Scenario

In this scenario, we are installing an access control system in Acme's Melbourne branch.

Acme have provided us with a basic building plan from which we can see we have two areas:

1. **Showroom**, and
2. **Warehouse**



For the purpose of this exercise, we are only implementing access control for the **Showroom** and **Showroom to Warehouse** doors.

- The **Showroom** will have a MultiProx card reader (set to card and PIN) for entry and a REX button for exit
- Valid access through the Showroom door should disarm the Showroom area
- The Showroom door should unlock during the hours of **8:00am and 5:00pm Monday to Friday** and from **10:00am to 4:00pm on Saturday**.

  This should **only** happen if the Showroom area is disarmed.
- The **Showroom to Warehouse** door will have a NanoProx reader for entry to the Warehouse and a REX button for exit
- Valid access through the Showroom to Warehouse door should disarm the Warehouse area

Door	Type	Internal Area	Schedule
Showroom Entry Door	Card/PIN entry, REX exit	Showroom	Opening Hours
Showroom to Warehouse	Card entry, REX exit	Warehouse	None

- The **Showroom** area will have the Showroom PIR, the Showroom Entry Door Reed, and the Showroom to Warehouse Door Reed assigned to it
- The **Warehouse** area will have one PIR in each corner, the Showroom to Warehouse Door Reed, and the Warehouse Roller Door Reed assigned to it
- We will also install a keypad in the Showroom that will be used to arm and disarm both areas

We will have 5 users as follows:

User	Role	PIN	Card
Manny Jah	Manager	1111	Card 1
Stu Roman	Storeman	2222	Card 2
Whare Hausmann	Storeman	3333	Card 3
Sel Ettuyu	Sales Rep	4444	Card 4
Ike Cansalla	Sales Rep	5555	Card 5

- Our manager requires 24/7 access to all areas.
- Our warehouse staff should have access to both the Warehouse and the Showroom, but only during opening hours.
- Our sales reps require access to both the Warehouse and the Showroom during opening hours. In addition, they should only be able to gain access to the Warehouse once the area has been disarmed by warehouse staff.

Tasks

The following tasks outline the basic steps for setting things up according to the scenario requirements. Detailed **Step by Step** instructions for each task are provided at the end of this module (see page 393) should you need them.

1. Restore a Blank Database and Default the Controller

Before you begin, you will need to **restore** a blank database so you can start with a new site and with nothing programmed. If you have not done this already in the previous module, do this now using the backup (.bak) file supplied on your USB training card.

You will also need to **default** your Controller.

2. Add a Controller

- Using the Add Controller Wizard, add a new Controller with:
  - 8 Inputs
  - 1 Keypad
  - 1 Reader Expander (we only need one as we are only access controlling two doors)

3. Bring the Controller Online and Address Health Status Issues

- Enter the serial number and IP address of the controller
- Set the Download Server
- Clear the health status message advising that the controller has been restarted
- Enable encryption
- Update all modules

4. Create Schedules

- Create an Opening Hours schedule
- Create a Showroom Armed schedule

  The Showroom Armed schedule will control the reader mode for the door.

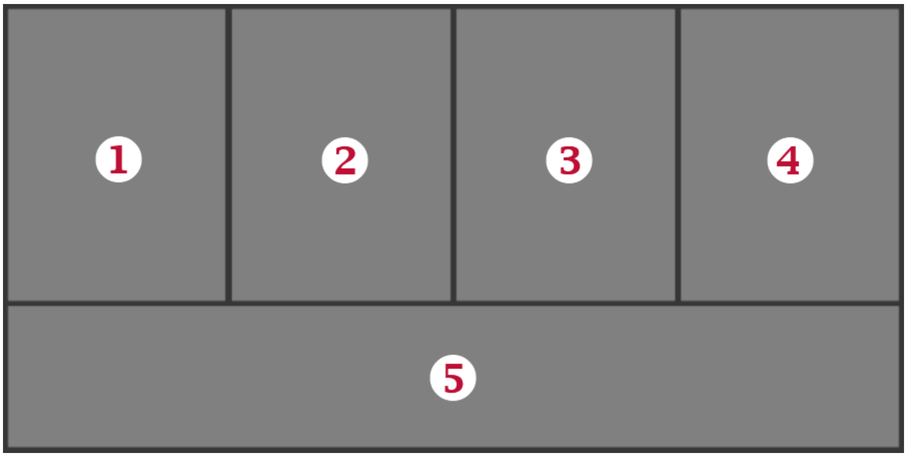
  - Set it to operate 24/7 and to ignore holidays.
  - Program the qualify output to the RD1 Green LED output.

5. Create Areas

- Create Showroom, Warehouse and System areas
- Set the exit delays to 10 seconds
- Set the bell output for both intruder areas to CP1:Bell 0
- Set the armed outputs to flash appropriate reader LEDs
- Set the exit and entry delay of the Showroom area to use the reader buzzer

6. Create a Technician Status Page

- Create a Technician Status Page to show:



1. All Door and Areas
2. All Inputs
3. All Outputs
4. All Trouble Inputs
5. All Events

7. Configure Inputs

- Name the inputs and set them up as required:

Input	Description
CP1:1	Showroom (PIR)
CP1:2	Warehouse NW (PIR)
CP1:3	Warehouse NE (PIR)
CP1:4	Warehouse SW (PIR)
CP1:5	Warehouse SE (PIR)
CP1:6	Warehouse Roller (Reed)
CP1:7	-
CP1:8	-

Input	Description
RD1:1	Showroom Door (Reed)
RD1:2	Showroom Door (REX)
RD1:3	Showroom Door (Bond)
RD1:4	-
RD1:5	Showroom to Warehouse Door (Reed)
RD1:6	Showroom to Warehouse Door (REX)
RD1:7	Showroom to Warehouse Door (Bond)
RD1:8	-

- Wire them so they are closed. Ensure the EOL values are set to match the wiring.
- Set the response time of the REX inputs to 50ms.
- Set the PIR and Reed inputs to use the Instant type.
- Assign the inputs to the appropriate areas.

8. Create a Door Type for the Showroom

- Create a new **Showroom** door type
- Set the operating schedule to the Showroom Door schedule
- Set the secondary mode to Card Only
- Set the primary mode to Card and PIN

9. Configure the Doors

- Name both doors for easy identification.
- Set the Showroom door to use the new Showroom door type.
- Set the unlock schedule to opening hours.
- Set the area inside for both doors.
- Set the **Door Lock follows...** and **Area disarmed AND…** options for the Showroom door.

10. Setup Auto Disarming

- Configure the Reader Expander so that both doors automatically disarm their area on valid access.

11. Create User Menu Groups

- Create a menu group that allows **Managers** access to control areas, view events and other system information, set the controller time, bypass inputs, and force arm the system.

  The menu group should also be configured so that managers are shown a greeting when logging in at the keypad, so that any alarms that are in the memory are shown on log in, and that managers can acknowledge these alarms from a keypad.

- Add a further menu group that allows **Staff** access to control areas, and configured so that they are shown a greeting when logging in at the keypad.

12. Create Area Groups

- Create Area Groups containing the relevant areas for:
  - Managers
  - Sales
  - Warehouse

13. Create Door Groups

- Create Door Groups containing the relevant doors and assigning schedules based on the user access requirements:
  - **Managers**: Our manager requires 24/7 access to both doors.
  - **Sales**: Our sales reps require access to both doors, but only during opening hours. They can only gain access to the Warehouse once warehouse staff have disarmed the area.
  - **Warehouse**: Our warehouse staff should have access to both doors, and only during opening hours.

14. Create Access Levels

- Create **Access Levels** for each of the following:
  - Managers
  - Sales
  - Warehouse

  Include the relevant Door Groups, Menu Groups, and Arming/Disarming Area Groups for each access level according to our user requirements.

  Remember that sales staff can only gain access to the Warehouse once warehouse staff have disarmed the area. This means that our sales reps should not be able to disarm the Warehouse, however they need to be able to **arm** it when they leave.

15. Create Users, Assign Access Levels, and Add Cards

- Create the following users, adding PINs and assigning the relevant access levels based on their role:

User	Role	PIN	Card
Manny Jah	Manager	1111	Card 1
Stu Roman	Storeman	2222	Card 2
Whare Hausmann	Storeman	3333	Card 3
Sel Ettuyu	Sales Rep	4444	Card 4
Ike Cansalla	Sales Rep	5555	Card 5

- Add each of the training cards to the corresponding user

16. Add Power Supply Module and Trouble Inputs

- Add the Power Supply module.
- Add the relevant trouble inputs:

Input Number	Description
AExxx:01	Module Tamper
AExxx:02	Mains Failure
AExxx:03	Low Battery / Battery Failure
AExxx:04	Output Voltage Low
AExxx:05	Output Over Current Failure
AExxx:06	Core Temperature Over Temp Failure
AExxx:08	Module Offline

- Add the new trouble inputs to the All Trouble Inputs status list.
- Wire the tamper input closed.

17. Add Trouble Inputs to the System Area

- Add the Trouble Inputs to the System area, setting the input type to silent

18. Create a Report IP Service

- Add a Report IP Service. For the purpose of this exercise, use the following details:
  - Client Code: 1234
  - IP Address: 123.45.67.89
  - IP Port: 9467
  - Reporting Protocol: ArmorIP (TCP) Encrypted

19. Address Health Status Issues

- View and address any health status issues

20. Set the Controller Time

- Ensure the Controller Date Time is set to the current date/time

Testing the System

Our last - and perhaps most important - task is **testing** the system. The following steps provide a good indication of how your final practical assessment will be marked. Each item represents one mark.

Using the software, **arm** the Showroom area.

- □ Did the area arm?
- □ Did the MultiProx Reader on Reader Expander 1 Port 1 (the Showroom Entry door) start beeping?
- □ Was the exit delay 10 seconds?
- □ Was the beeping made up of a short beep every second?
- □ Did the Reader LED start flashing once the area armed?

Badge **Card** 1 (Manny Jah) at the **Showroom Entry** door (the MultiProx Reader on Reader Expander 1 Port 1).

Enter the PIN 1111 if required.

- □ Was a PIN required?
- □ Was the PIN 1111 accepted and access granted?
- □ Did the Showroom area disarm?

If the showroom area failed to disarm, manually disarm it now using the software.

Badge **Card** 1 (Manny Jah) at the Showroom Entry door again.

- □ Was access granted without requiring a PIN?

Badge **Card** 1 at the Showroom Entry door **twice**.

- □ Did the Showroom area begin to arm?

If the showroom area failed to arm, manually arm it now using the software.

Set the Controller time to **7:50am** on a Monday.

Badge **Card** 3 (Whare Hausmann) at the Showroom Entry door.

- □ Was access denied?

Badge **Card** 5 (Ike Cansalla) at the Showroom Entry door.

- □ Was access denied?

Set the Controller time to **7:59am** on a Monday.

- □ After 60 seconds or less, did the Office Hours Schedule become valid?
- □ Did the Showroom door remain locked?

Badge **Card 5** (Ike Cansalla) at the **Showroom Entry** door and enter PIN 5555.

- □ Was access granted?
- □ Did the Showroom door unlock and remain unlocked?

Badge **Card 5** at the **Showroom to Warehouse** door.

- □ Was access denied?

Badge **Card 3** (Whare Hausmann) at the **Showroom to Warehouse** door.

- □ Was access granted?

Badge **Card 5** (Ike Cansalla) at the **Showroom to Warehouse** door again.

- □ Was access now granted?

Set the Controller time to **4:59pm** on a Monday.

- □ After 60 seconds or less, did the Showroom door lock again?

Using the software, **arm** the Warehouse area.

- □ Did the area arm?
- □ Did the Nano Reader on Reader Expander 1 Port 2 (the Showroom to Warehouse door) start beeping?
- □ Did the Reader LED start flashing once the area armed?

Set the Controller time to **3:59pm** on a Saturday.

- □ After 60 seconds or less, did the Showroom door lock?

Badge **Card 5** (Ike Cansalla) at the **Showroom to Warehouse** door.

- □ Was access denied?

Badge **Card 1** (Manny Jah) at the **Showroom to Warehouse** door.

- □ Was access granted?

Using the software, ensure that the Showroom, Warehouse and System areas are **armed**.

Open input CP1:1.

- □ Did a **Report in Showroom …** event get produced?
- □ Did the **Bell output** activate?

Open the tamper input on the PSU.

- □ Did a **Report in System …** event get produced?

Next Steps

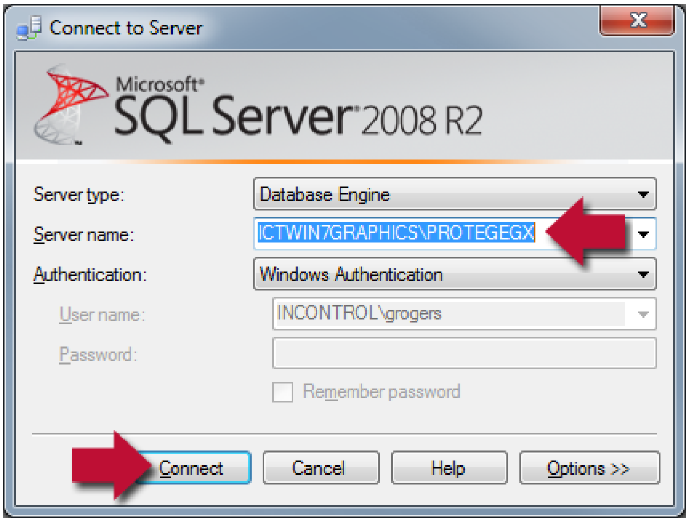
If you've answered yes to 90% or more of these items, you're probably ready to sit the final assessment. If not, continue practicing until you can.

Step by Step Tasks

Task 1: Restoring a Blank Database and Defaulting the Controller

1. Ensure the Protege GX Services are stopped.
   - From the Windows Start menu, choose **Control Panel | Administrative Tools | Services.**
   - Scroll down to locate the services
   - Right click and choose **Stop**
2. Open Microsoft SQL Server Management Studio.

   The first time you connect, you will need to specify the server name. If you accepted the defaults during installation, this will be **COMPUTERNAME\PROTEGEGX** where COMPUTERNAME is the name of the PC that GX is installed on.



Server type: Database Engine

Server name: ICTWIN7GRAPHICS\PROTEGEGX

Authentication: Windows Authentication

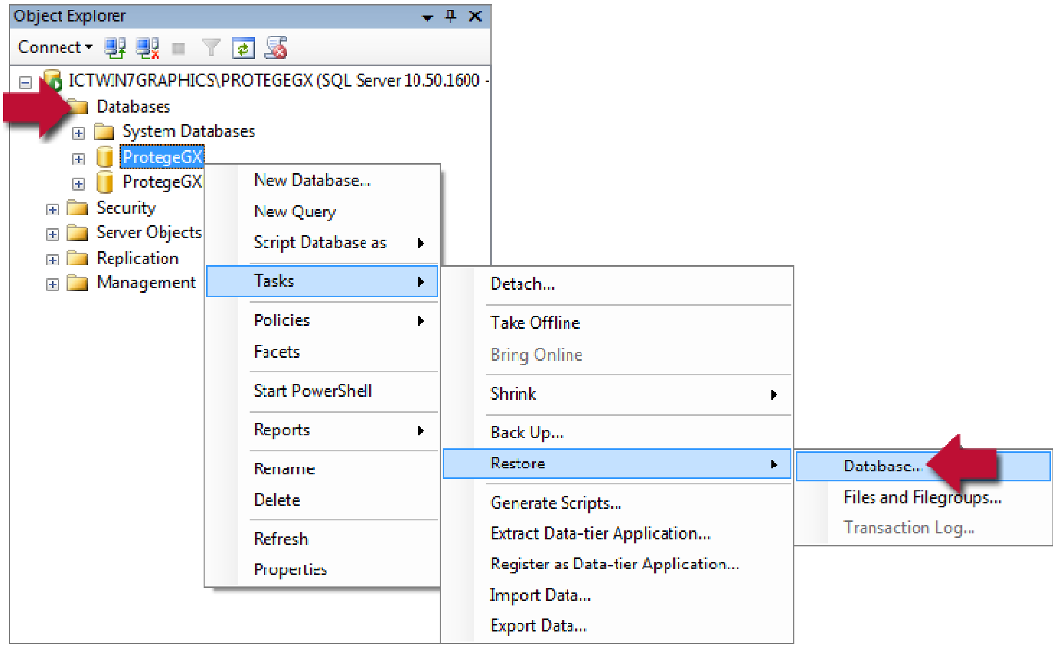
User name: INCONTROL\grogers

Password:

□ Remember password

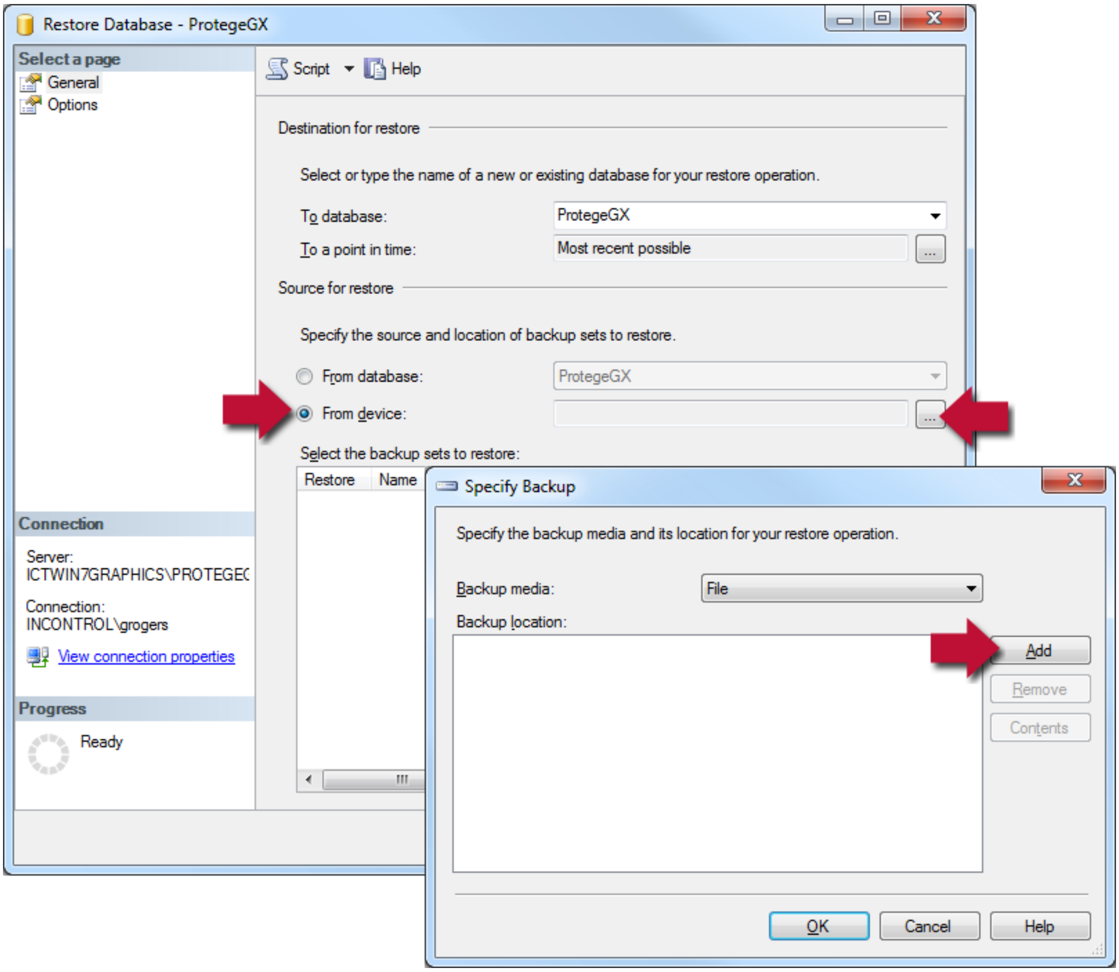
3. Click **Connect** to continue.
4. Click to expand the **Databases** node in the Object Explorer

5. Right click the **ProtegeGX** database and select **Tasks | Restore | Database…**



6. Under the Source for restore, select **From Device**, then click the **[...]** button.

The Specify Backup window opens.



Destination for restore

Select or type the name of a new or existing database for your restore operation.

To database: ProtegeGX

To a point in time: Most recent possible

Source for restore

Specify the source and location of backup sets to restore.

○ From database: ProtegeGX

● From device:

Select the backup sets to restore:

Server:
ICTWIN7GRAPHICS\PROTEGEC

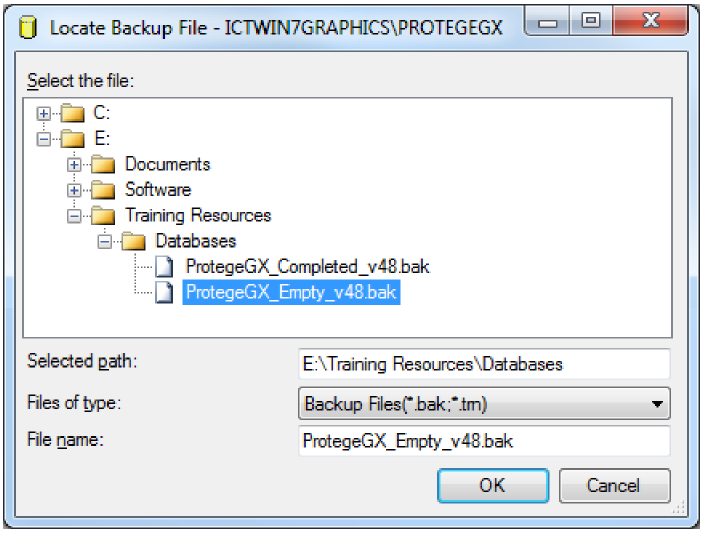
Connection:
INCONTROL\grogers

Specify the backup media and its location for your restore operation.

Backup media: File

Backup location:

7. Click **Add** to browse to the backup file to be restored.



Locate Backup File - ICTWIN7GRAPHICS\PROTEGEGX

Select the file:

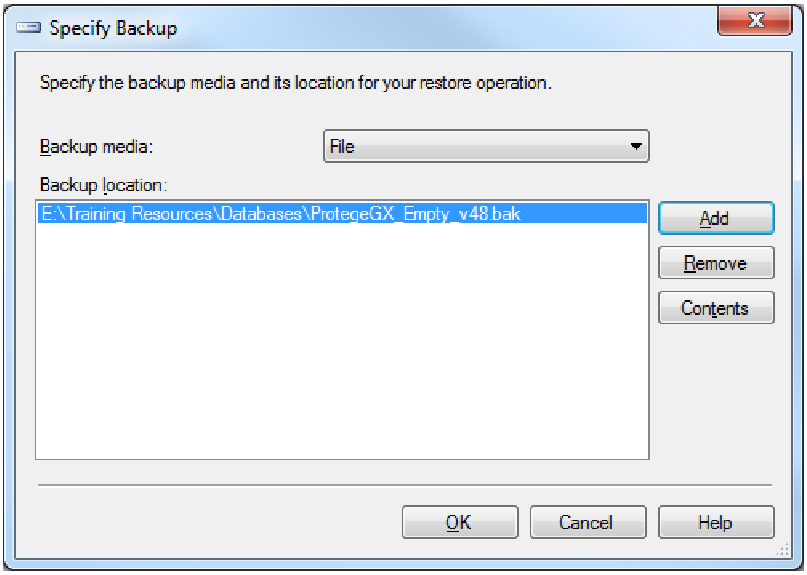
Selected path: E:\Training Resources\Databases

Files of type: Backup Files(*.bak;*.tm)

File name: ProtegeGX_Empty_v48.bak

8. Browse to the backup file on your USB training card and click **OK**.

9. You'll see that the file has been added as a backup path. Click **OK**.



Specify Backup

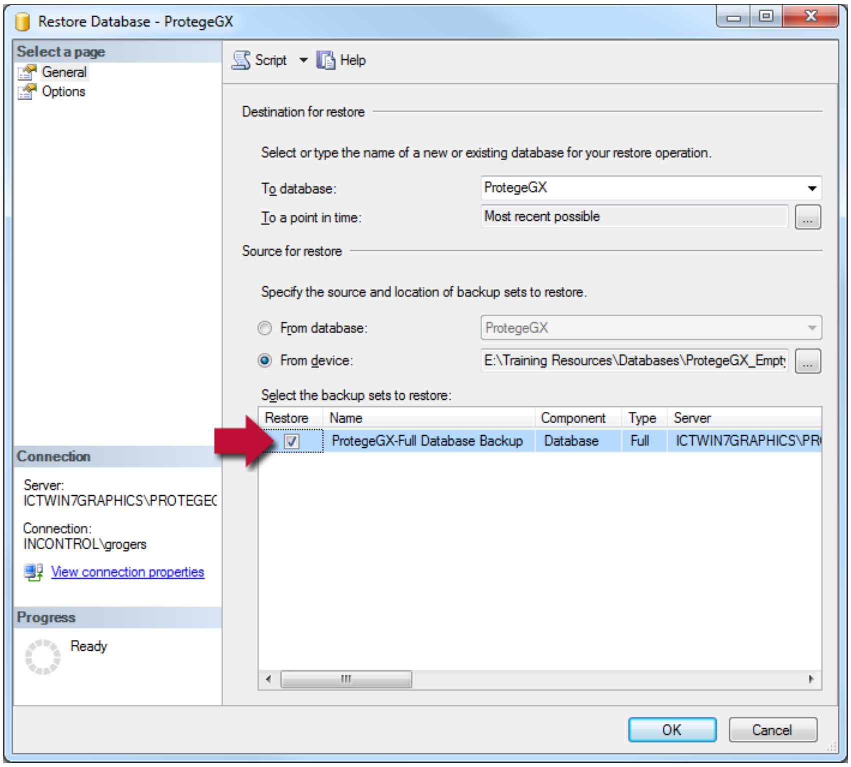
Specify the backup media and its location for your restore operation.

Backup media: File

Backup location:

E:\Training Resources\Databases\ProtegeGX_Empty_v48.bak

10. Select (enable) the **Restore** check box beside the backup set.



Restore Database - ProtegeGX

Select a page
- General
- Options

Script ▾ Help

Destination for restore

Select or type the name of a new or existing database for your restore operation.

To database: ProtegeGX

To a point in time: Most recent possible

Source for restore

Specify the source and location of backup sets to restore.

○ From database: ProtegeGX

● From device: E:\Training Resources\Databases\ProtegeGX_Empt

Select the backup sets to restore:

Restore	Name	Component	Type	Server
☑	ProtegeGX-Full Database Backup	Database	Full	ICTWIN7GRAPHICS\PR

Connection

Server:
ICTWIN7GRAPHICS\PROTEGE(

Connection:
INCONTROL\grogers

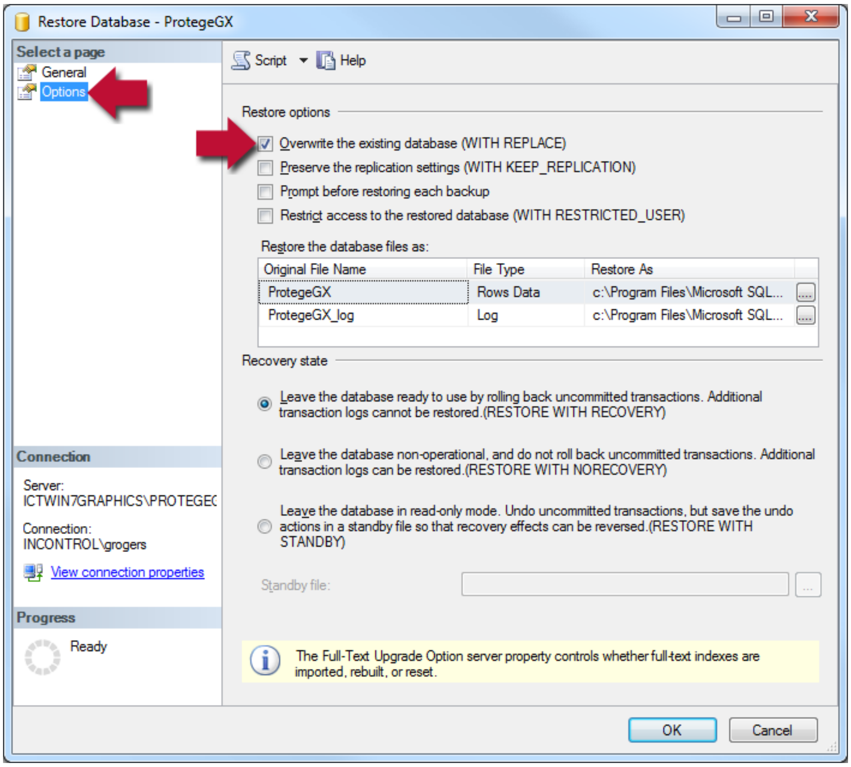
View connection properties

Progress

Ready

OK Cancel

11. Click the **Options** page and ensure the Restore options are set to **Overwrite the existing database.**



Restore Database - ProtegeGX

Select a page
- General
- Options

Script ▾ Help

Restore options

☑ Overwrite the existing database (WITH REPLACE)

□ Preserve the replication settings (WITH KEEP_REPLICATION)

□ Prompt before restoring each backup

□ Restrict access to the restored database (WITH RESTRICTED_USER)

Restore the database files as:

Original File Name	File Type	Restore As
ProtegeGX	Rows Data	c:\Program Files\Microsoft SQL...
ProtegeGX_log	Log	c:\Program Files\Microsoft SQL...

Recovery state

● Leave the database ready to use by rolling back uncommitted transactions. Additional transaction logs cannot be restored.(RESTORE WITH RECOVERY)

○ Leave the database non-operational, and do not roll back uncommitted transactions. Additional transaction logs can be restored.(RESTORE WITH NORECOVERY)

○ Leave the database in read-only mode. Undo uncommitted transactions, but save the undo actions in a standby file so that recovery effects can be reversed.(RESTORE WITH STANDBY)

Standby file:

The Full-Text Upgrade Option server property controls whether full-text indexes are imported, rebuilt, or reset.

Connection

Server:
ICTWIN7GRAPHICS\PROTEGE(

Connection:
INCONTROL\grogers

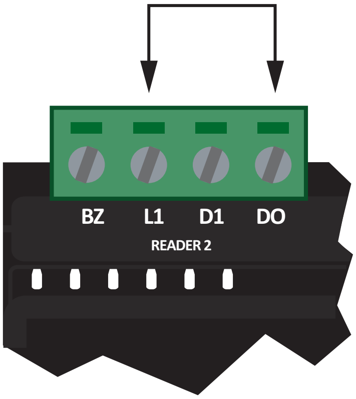
View connection properties

Progress

Ready

OK Cancel

12. Click **OK** to start the restore process.
13. Restart the Protege GX Services.
14. Remove the power to the controller by disconnecting the 12V DC input.
15. Connect a wire link between **Reader 2** D0 input and **Reader 2** L1 output.

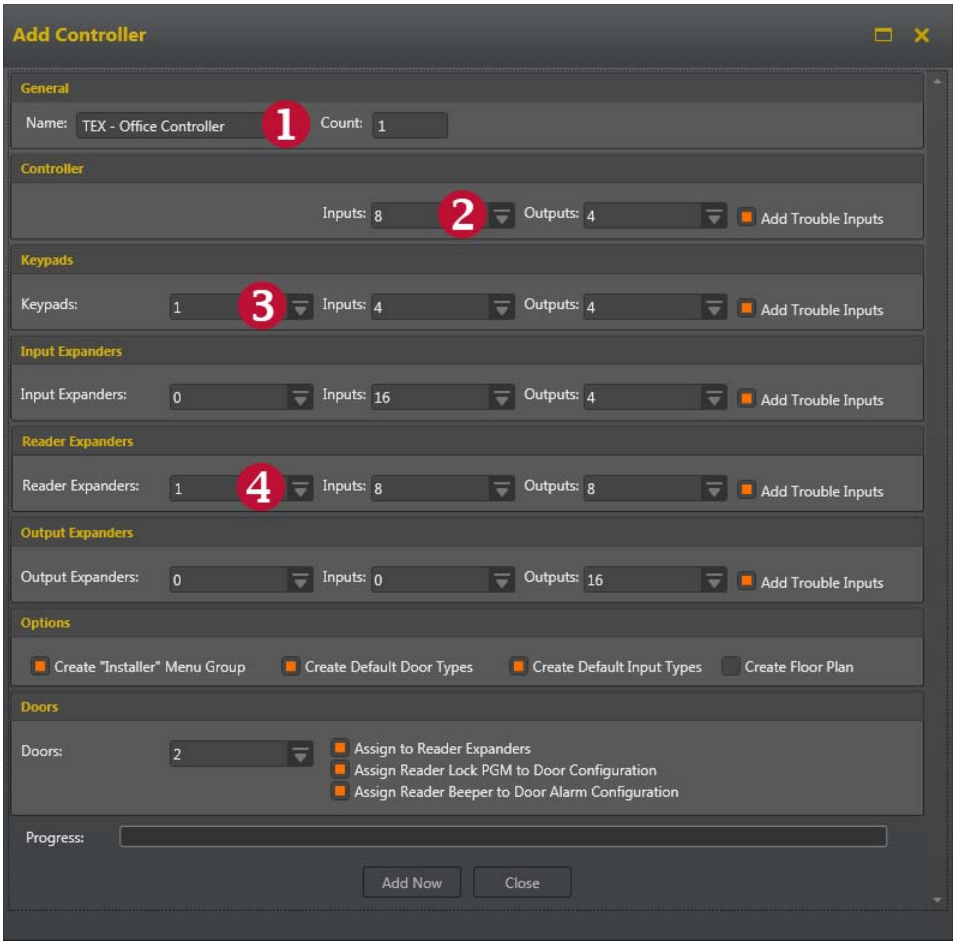


16. Power up the Controller.

Once the Controller has started and the Status light is flashing, you can remove the wire link from the Reader 2 connector.

Task 2: Adding a Controller

- Navigate to Sites | Controllers and click Add
- Choose the option to Add a controller with default records



Add Controller

General

Name: TEX - Office Controller Count: 1

Controller

Inputs: 8 Outputs: 4 ☑ Add Trouble Inputs

Keypads

Keypads: 1 Inputs: 4 Outputs: 4 ☑ Add Trouble Inputs

Input Expanders

Input Expanders: 0 Inputs: 16 Outputs: 4 ☑ Add Trouble Inputs

Reader Expanders

Reader Expanders: 1 Inputs: 8 Outputs: 8 ☑ Add Trouble Inputs

Output Expanders

Output Expanders: 0 Inputs: 0 Outputs: 16 ☑ Add Trouble Inputs

Options

☑ Create "Installer" Menu Group ☑ Create Default Door Types ☑ Create Default Input Types □ Create Floor Plan

Doors

Doors: 2
☑ Assign to Reader Expanders
☑ Assign Reader Lock PGM to Door Configuration
☑ Assign Reader Beeper to Door Alarm Configuration

Progress:

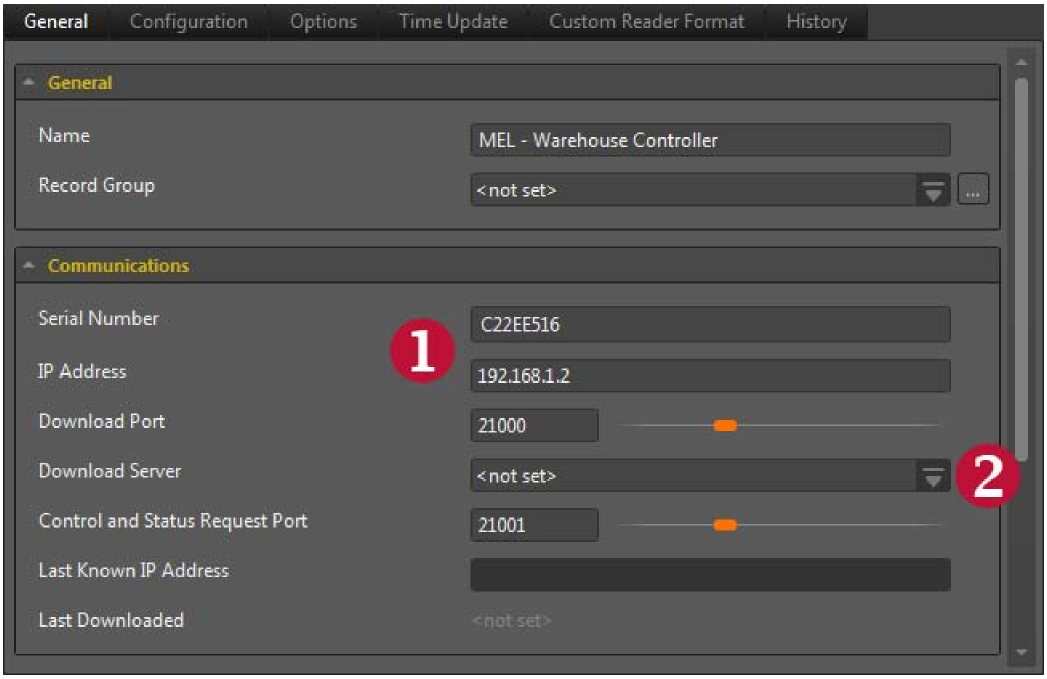
- Include the following hardware records:

1. 1 Controller
2. 8 Controller Inputs
3. 1 Keypad
4. 1 Reader Expander

- Click Add Now

Task 3: Bringing the Controller Online and Viewing Health Status

1. Add the **Serial Number** and **IP Address** of the Controller



General | Configuration | Options | Time Update | Custom Reader Format | History

General

Name: MEL - Warehouse Controller

Record Group: <not set>

Communications

Serial Number: C22EE516

IP Address: 192.168.1.2

Download Port: 21000

Download Server: <not set>

Control and Status Request Port: 21001

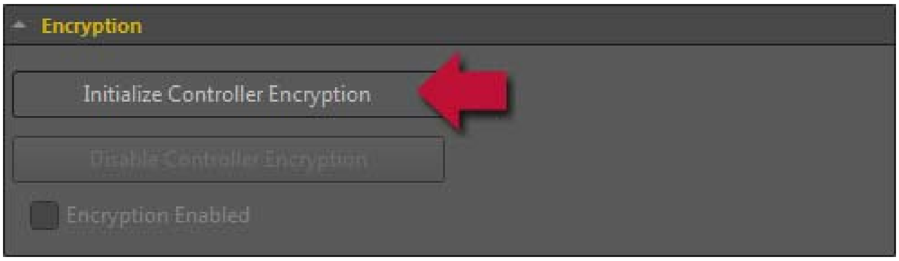
Last Known IP Address:

Last Downloaded: <not set>

2. Set the **Download Server**, then click Save.

   Your Controller should come online within a few seconds.

3. Right-click on the Controller and choose **Get Health Status**
4. **Clear** the message advising that the Controller has been restarted
5. Select the **Configuration** tab and click **Initialize Controller Encryption**:



Encryption

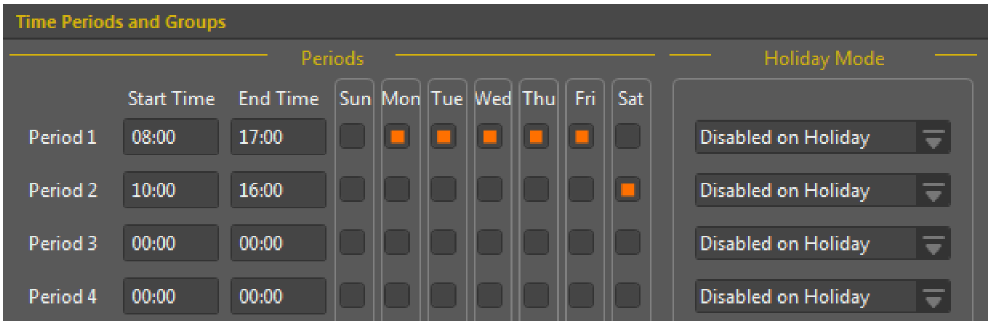
Initialize Controller Encryption
Disable Controller Encryption

□ Encryption Enabled

6. Right click the Controller and select **Update Modules**

Task 4: Creating Schedules

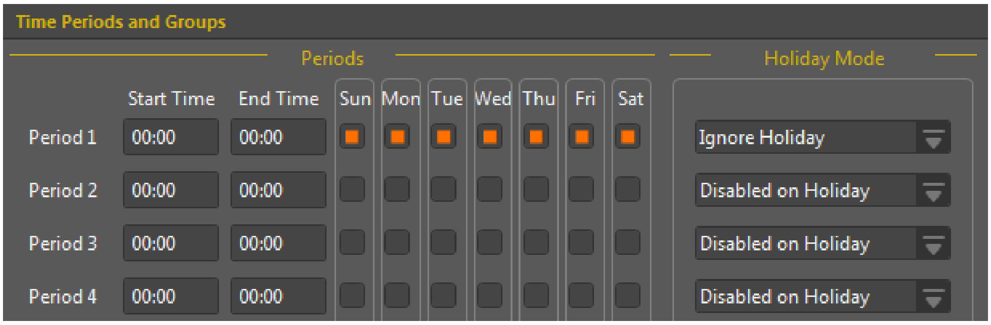
1. Navigate to **Sites | Schedules** and click **Add**
2. Create the **Opening Hours** schedule and define the period the schedule applies to (8:00am and 5:00pm Monday to Friday and from 10:00am to 4:00pm on Saturday).



Time Periods and Groups

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	08:00	17:00	☐	☑	☑	☑	☑	☑	☐	Disabled on Holiday
Period 2	10:00	16:00	☐	☐	☐	☐	☐	☐	☑	Disabled on Holiday
Period 3	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday
Period 4	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday

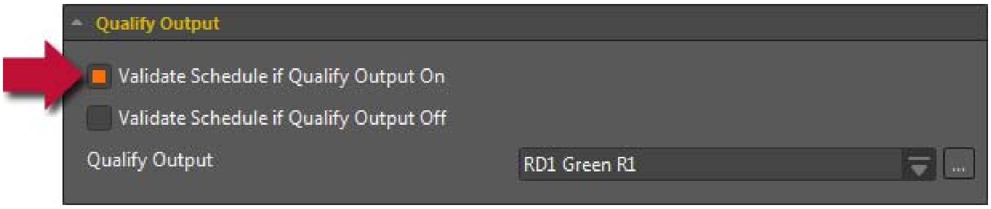
3. Create the **Managers Hours** schedule setting the time period to 24/7 and the holiday mode to **Ignore Holiday**



Time Periods and Groups

	Start Time	End Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Holiday Mode
Period 1	00:00	00:00	☑	☑	☑	☑	☑	☑	☑	Ignore Holiday
Period 2	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday
Period 3	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday
Period 4	00:00	00:00	☐	☐	☐	☐	☐	☐	☐	Disabled on Holiday

4. Create an additional schedule **Showroom Armed** setting the time period to 24/7 and the holiday mode to **Ignore Holiday**
5. Go to the **Options** tab and select (enable) the **Validate Schedule if Qualify Output On** option



Qualify Output

☑ Validate Schedule if Qualify Output On

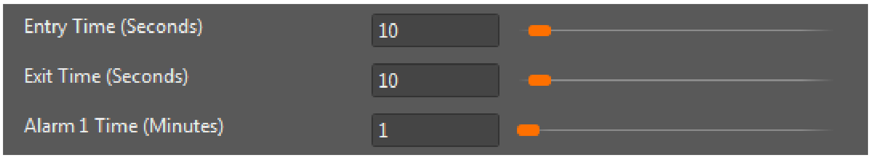
☐ Validate Schedule if Qualify Output Off

Qualify Output: RD1 Green R1

6. Set the **Qualify Output** to **RD1 Green R1**

Task 5: Creating Areas

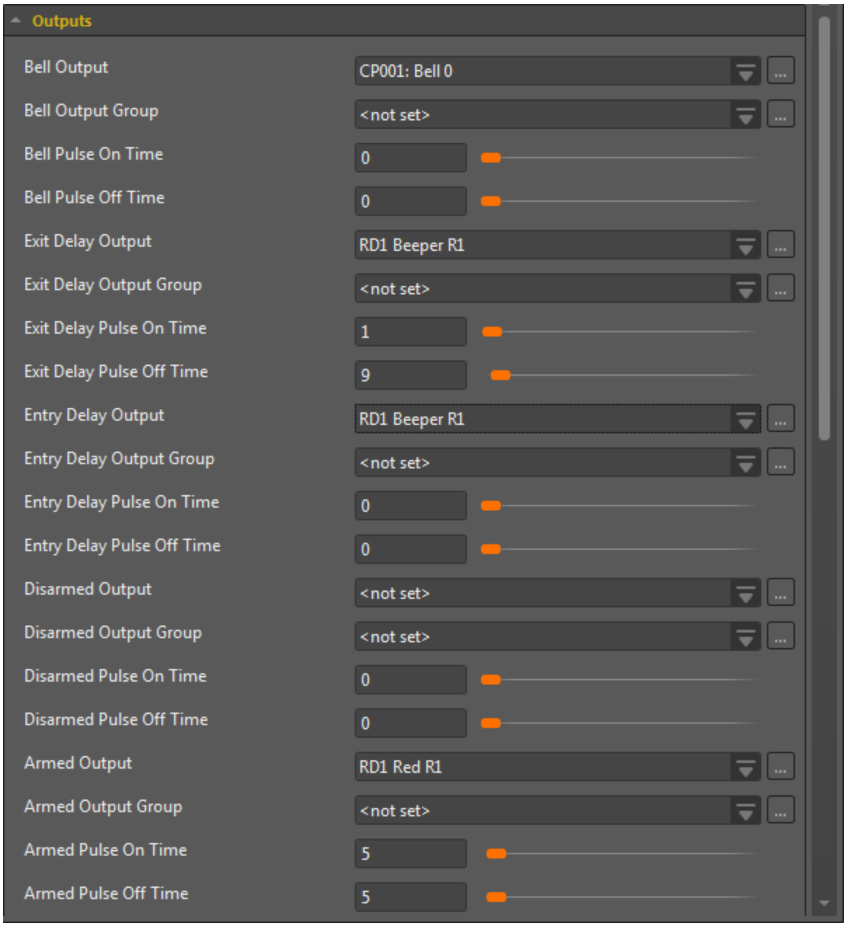
1. Navigate to **Programming | Areas** and click **Add** to create the **Showroom** area
2. Select the **Configuration** tab:



Entry Time (Seconds)	10
Exit Time (Seconds)	10
Alarm 1 Time (Minutes)	1

- Set the **Entry Time** to **10 seconds.**
- Set the **Exit Time** to **10 seconds.**
- Set the **Alarm 1 Time** to **1 minute.**

3. Select the **Outputs** tab:



Outputs

Bell Output	CP001: Bell 0
Bell Output Group	<not set>
Bell Pulse On Time	0
Bell Pulse Off Time	0
Exit Delay Output	RD1 Beeper R1
Exit Delay Output Group	<not set>
Exit Delay Pulse On Time	1
Exit Delay Pulse Off Time	9
Entry Delay Output	RD1 Beeper R1
Entry Delay Output Group	<not set>
Entry Delay Pulse On Time	0
Entry Delay Pulse Off Time	0
Disarmed Output	<not set>
Disarmed Output Group	<not set>
Disarmed Pulse On Time	0
Disarmed Pulse Off Time	0
Armed Output	RD1 Red R1
Armed Output Group	<not set>
Armed Pulse On Time	5
Armed Pulse Off Time	5

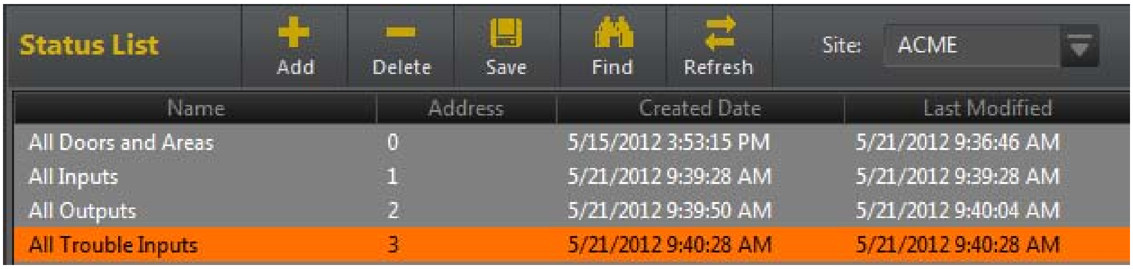
- Set the **Bell Output** to **CP001: Bell 0**
- Set the **Exit Delay Output** to **RD1 Beeper R1**
- Set the **Exit Delay Pulse On Time** to **1**
- Set the **Exit Delay Pulse Off Time** to **9**
- Set the **Entry Delay Output** to **RD1 Beeper R1**
- Set the **Disarmed Output** to **<not set>**
- Set the **Armed Output** to **RD1 Red R1**
- Set the **Armed Pulse On** and **Armed Pulse Off Times** to **5**

4. Repeat these steps to create the **Warehouse** area, but using **RD1 Beeper R2** and **RD1 Red R2**
5. Create a **System** area, setting the Entry and Exit delay times to **0**.

Task 6: Creating a Technician Status Page

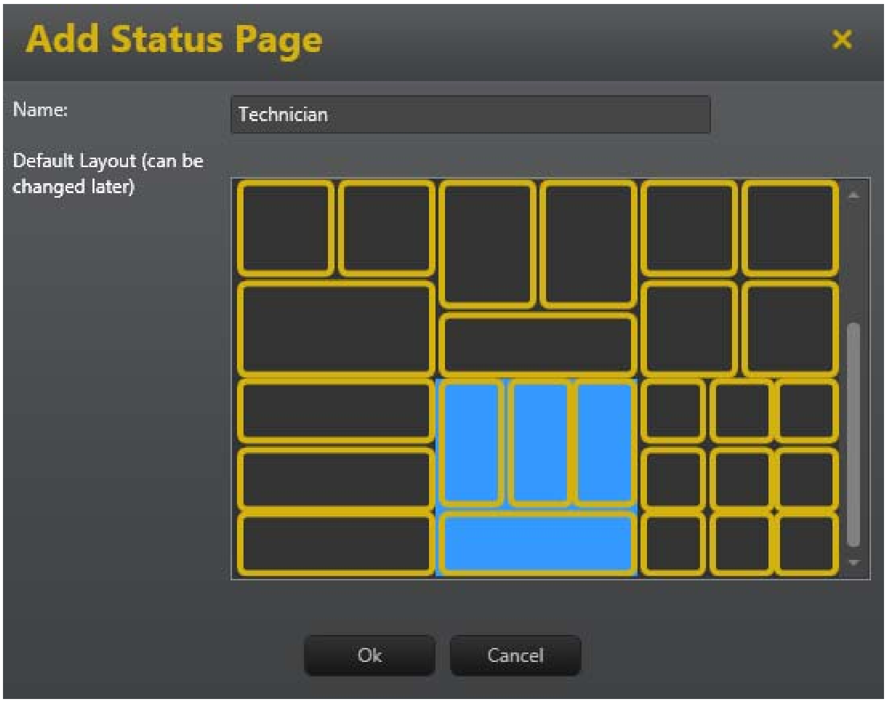
1. Navigate to Monitoring | Setup | Status Lists
2. Change the name of the default status list to All Doors and Areas.
3. Click Add to open the Select Devices window
4. Set the Device Type to Door and choose your Controller
5. Select all doors, then click OK
6. Repeat steps 3 to 5 to add all areas to the status list
7. Add a new status list by clicking the Add button on the main toolbar
8. Call this one All Inputs
9. Change the device type to Input, select the Controller, then choose all of the inputs
10. Repeat to create additional status lists for All Outputs and All Trouble Inputs

    You should now have 4 status lists:



Name	Address	Created Date	Last Modified
All Doors and Areas	0	5/15/2012 3:53:15 PM	5/21/2012 9:36:46 AM
All Inputs	1	5/21/2012 9:39:28 AM	5/21/2012 9:39:28 AM
All Outputs	2	5/21/2012 9:39:50 AM	5/21/2012 9:40:04 AM
All Trouble Inputs	3	5/21/2012 9:40:28 AM	5/21/2012 9:40:28 AM

11. Open the Status Page Editor: Monitoring | Setup | Status Page Editor
12. Name the page Technician, then scroll down and select the layout as shown



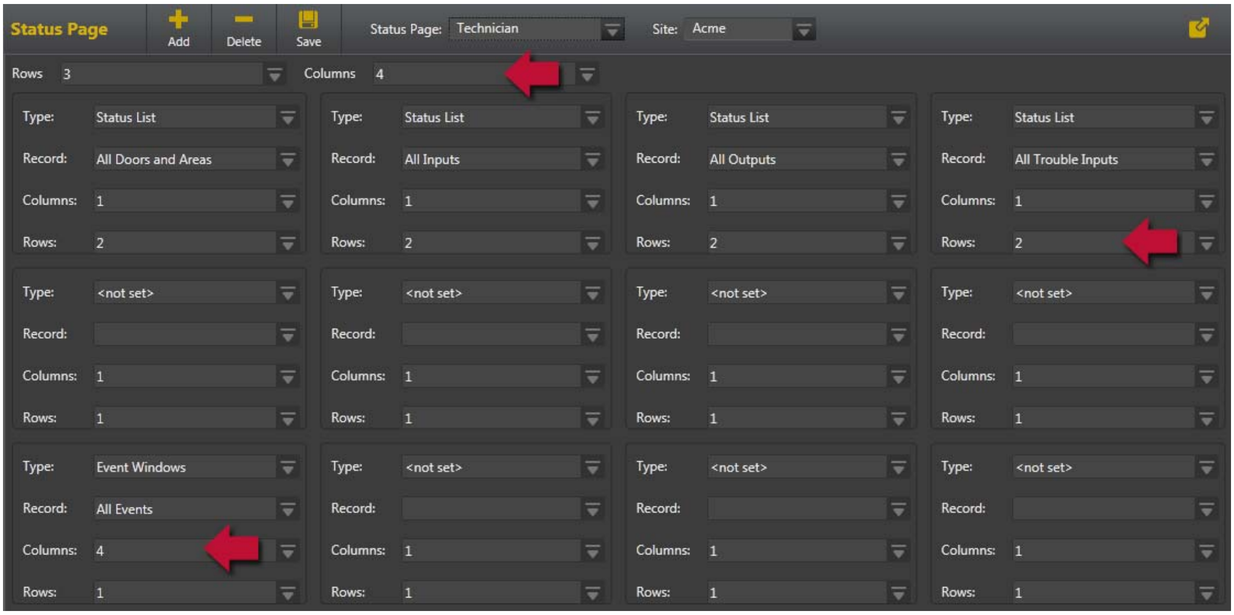
Name: Technician

Default Layout (can be changed later)

13. Click OK. This creates an empty page with a preset layout. The layout can be changed later, so this is just a starting point.
14. Set the Columns to 4

15. In each of the top panels, set the Type to **Status List** and choose a different list for each

    Make sure you set the **Rows** to **2** in the right most panel



Status Page: Technician

Site: Acme

Rows 3

Columns 4

Type: Status List Record: All Doors and Areas Columns: 1 Rows: 2	Type: Status List Record: All Inputs Columns: 1 Rows: 2	Type: Status List Record: All Outputs Columns: 1 Rows: 2	Type: Status List Record: All Trouble Inputs Columns: 1 Rows: 2
Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1
Type: Event Windows Record: All Events Columns: 4 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1	Type: <not set> Record: Columns: 1 Rows: 1

16. In the bottom left panel, set the Type to **Event Windows** and choose the **All Events** Record.
17. Adjust the **Columns** so it spans all **4** columns
18. Save the page

Task 7: Configuring Inputs

1. Rename the inputs as required based on their function:

Input	Description
CP1:1	Showroom (PIR)
CP1:2	Warehouse NW (PIR)
CP1:3	Warehouse NE (PIR)
CP1:4	Warehouse SW (PIR)
CP1:5	Warehouse SE (PIR)
CP1:6	Warehouse Roller (Reed)
CP1:7	-
CP1:8	-

Input	Description
RD1:1	Showroom Door (Reed)
RD1:2	Showroom Door (REX)
RD1:3	Showroom Door (Bond)
RD1:4	-
RD1:5	Showroom to Warehouse Door (Reed)
RD1:6	Showroom to Warehouse Door (REX)
RD1:7	Showroom to Warehouse Door (Bond)
RD1:8	-

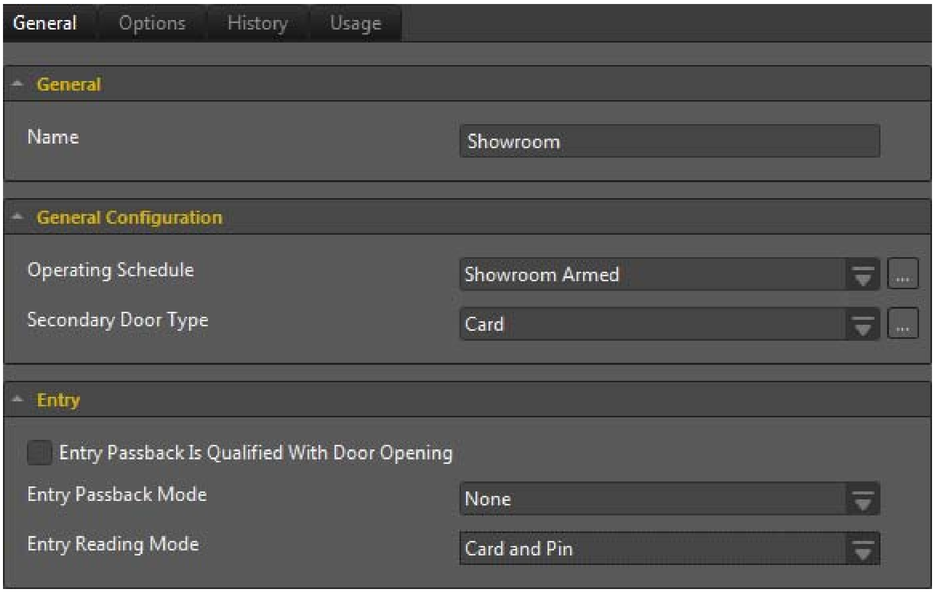
   Remember to use our consistent naming convention. So CP1:1, should become **Showroom (PIR) MEL CP1:1**

2. Wire the inputs so they are closed.
3. Select all inputs (CTRL + A) and set the **Input End of Line (EOL)** values on the Options tab to match how you have wired your inputs
4. Use the Find tool to locate the **REX** inputs
5. Set the **Alarm Input Speed** and **Restore Input Speed** to 50 msec

6. Use the Find tool to locate the **PIR** inputs
7. Set the **Input Type** to Instant
8. Use the Find tool to locate the **Reed** inputs
9. Set the **Input Type** to Instant
10. Use the Find tool to locate the **Showroom** inputs
11. Select the **Showroom PIR** and **Showroom Door Reed**, then click the **Areas and Input Types** tab.
12. Set the First Assigned Area to **Showroom**
13. Use the Find tool again to locate inputs with the word **Warehouse**
14. Select the first five inputs (the 4 Warehouse PIRs and the Warehouse Roller Reed) and set the First Assigned Area to **Warehouse**
15. Select the **Showroom to Warehouse Door Reed** input
16. Set the First Assigned Area to **Showroom**
17. Set the Second Assigned Area to **Warehouse** and the Input Type to **Instant**

Task 8: Creating a New Door Type

1. Navigate to **Programming | Door Types:**
2. Add a new door type called **Showroom**



General

Name: Showroom

General Configuration

Operating Schedule: Showroom Armed

Secondary Door Type: Card

Entry

☐ Entry Passback Is Qualified With Door Opening

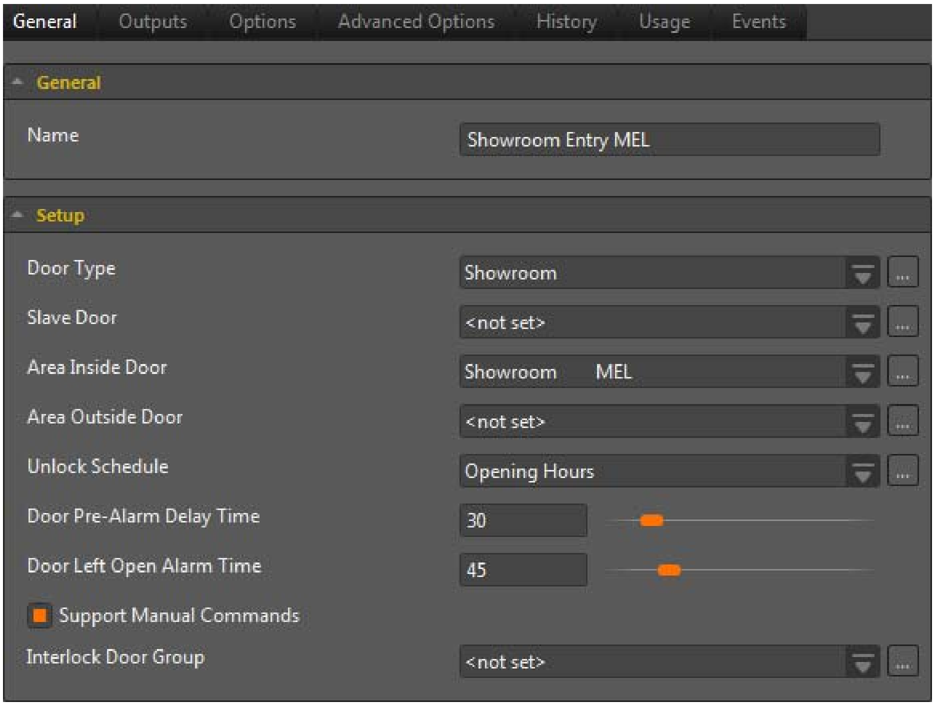
Entry Passback Mode: None

Entry Reading Mode: Card and Pin

3. Set the **Operating Schedule** to **Showroom Armed**
4. Set the **Secondary Type** to **Card**
5. Set the **Entry Reading Mode** to **Card and PIN**

Task 9: Configuring Doors

1. Navigate to **Programming | Doors**
2. Using our naming conventions, rename DR1 to **Showroom Entry MEL**
3. Set the **Door Type** to Showroom
4. Set the **Area Inside Door** to **Showroom**
5. Set the **Unlock Schedule** to **Opening Hours**



General

Name: Showroom Entry MEL

Setup

Door Type: Showroom

Slave Door: <not set>

Area Inside Door: Showroom MEL

Area Outside Door: <not set>

Unlock Schedule: Opening Hours

Door Pre-Alarm Delay Time: 30

Door Left Open Alarm Time: 45

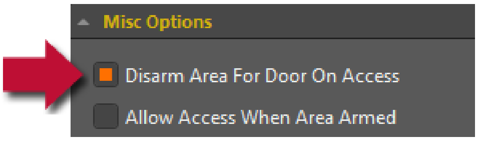
☑ Support Manual Commands

Interlock Door Group: <not set>

6. Select the **Options** tab and enable the following options:
   - **Door Lock Follows Inside Area**
   - **Area Disarmed AND Schedule Valid Unlock Door**
7. Rename DR2 to **Showroom to Warehouse MEL**
8. Set the **Area Inside Door** to **Warehouse**

Task 10: Setting up Auto Disarming

1. Navigate to **Expanders | Reader Expanders** and select RD1
2. Go to the **Reader One** tab and select (enable) the **Disarm Area For Door On Access** option



Misc Options

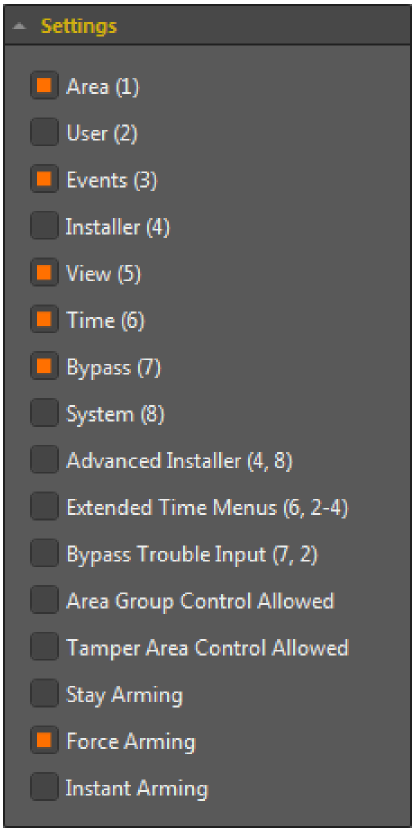
☑ Disarm Area For Door On Access

☐ Allow Access When Area Armed

3. Repeat for the **Reader Two** tab.
4. Save the changes

Task 11: Creating User Menu Groups

1. Navigate to **Groups** | **Menu Groups**
2. Add a new menu group called **Manager**
3. Select (enable) the following settings:
   - **Areas (1):** Area Control
   - **Events (3):** View Events
   - **View (5):** View other system information
   - **Time (6):** Set the Controller time
   - **Bypass (7):** Bypass Inputs
   - **Force Arming:** Force arm the system
4. Click the **Options** tab and select (enable) the following options:
   - **Show User Greeting**
   - **User Can Acknowledge Alarm Memory**
   - **Show User Alarm Memory on Logon**
5. Add another menu group called **Staff**
6. Check the **Area (1)** setting to allow area control
7. Under the **Options** tab select (enable) the **Show User Greeting** option

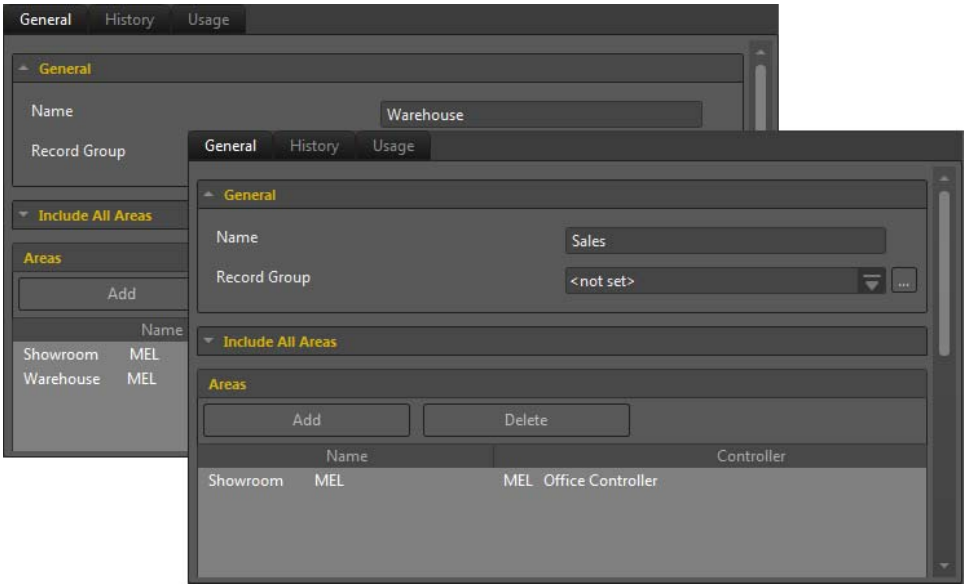


Settings

☑ Area (1)
☐ User (2)
☑ Events (3)
☐ Installer (4)
☑ View (5)
☑ Time (6)
☑ Bypass (7)
☐ System (8)
☐ Advanced Installer (4, 8)
☐ Extended Time Menus (6, 2-4)
☐ Bypass Trouble Input (7, 2)
☐ Area Group Control Allowed
☐ Tamper Area Control Allowed
☐ Stay Arming
☑ Force Arming
☐ Instant Arming

Task 12: Creating Area Groups

1. Navigate to **Groups** | **Area Groups**
2. Add a new area group called **Managers**
3. Add the **Showroom** and the **Warehouse** areas
4. Now create a **Sales** area group with the Showroom area, and a **Warehouse** area group with both the Showroom and the Warehouse area:



Name: Warehouse
Record Group

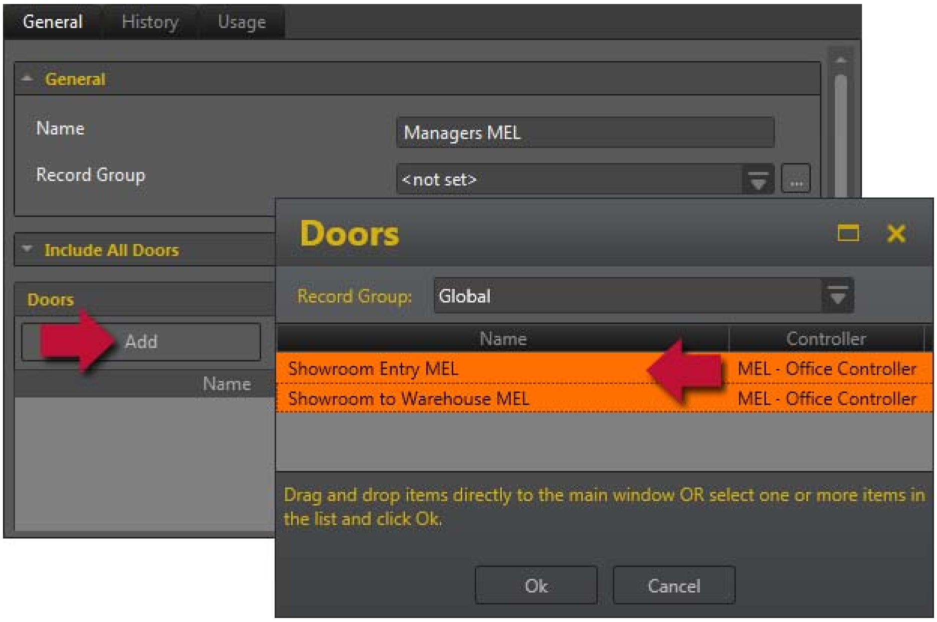
Name	
Showroom	MEL
Warehouse	MEL

Name: Sales
Record Group: <not set>

Name		Controller
Showroom	MEL	MEL Office Controller

Task 13: Creating Door Groups

1. Navigate to **Groups | Door Groups**
2. Click **Add** button and create a new door group **Managers MEL**
3. Click **Add** to open the Doors selection window



Name: Managers MEL

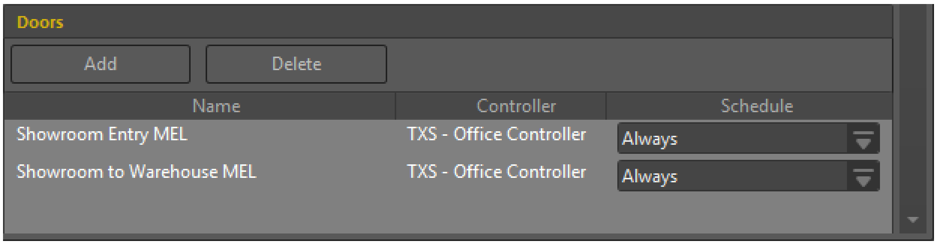
Record Group: <not set>

Record Group: Global

Name	Controller
Showroom Entry MEL	MEL - Office Controller
Showroom to Warehouse MEL	MEL - Office Controller

Drag and drop items directly to the main window OR select one or more items in the list and click Ok.

4. Select both doors and click **OK**
5. Change the schedule to the **Managers Hours**



Name	Controller	Schedule
Showroom Entry MEL	TXS - Office Controller	Always
Showroom to Warehouse MEL	TXS - Office Controller	Always

6. Create a new door group called **Sales Staff MEL**
7. Add the **Showroom** and **Showroom to Warehouse** doors
8. Assign the **Opening Hours** schedule
9. Create another door group for **Warehouse Staff MEL**
10. Add the **Showroom** and **Showroom to Warehouse** doors
11. Assign the **Opening Hours** schedule

Task 14: Creating Access Levels

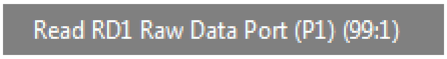
1. Navigate to Users | Access Levels
2. Create a Managers access level
   - Select the Door Groups tab and add the Managers door group with the schedule set to Managers Hours
   - Select the Menu Groups tab and add the Managers menu group
   - Select the Disarming Area Groups tab and add the Managers area group with the schedule set to Managers Hours
   - Select the Arming Area Groups tab and add the Managers area group
3. Create a Sales access level
   - Select the Door Groups tab and add the Sales Staff door group with the schedule set to Opening Hours
   - Select the Menu Groups tab and add the Staff menu group
   - Select the Disarming Area Groups tab and add the Sales area group with the schedule set to Opening Hours
   - Select the Arming Area Groups tab and add the Sales and Warehouse area groups
4. Create a Warehouse access level
   - Select the Door Groups tab and add the Warehouse Staff door group with the schedule set to Opening Hours
   - Select the Menu Groups tab and add the Staff menu group
   - Select the Disarming Area Groups tab and add the Warehouse area group with the schedule set to Opening Hours
   - Select the Arming Area Groups tab and add the Warehouse area group

Task 15: Creating Users, Assigning Access Levels, and Adding Cards

1. Navigate to **Users | Users**
2. Create a new user named **Manny Jah** with the PIN **1111**
3. Select the **Access Levels** tab. Add the **Managers** access level and click OK
4. Create additional users, adding PINs and assigning access levels as follows:

User	Role	PIN	Card	Access Level
Manny Jah	Manager	1111	Card 1	Managers
Stu Roman	Storeman	2222	Card 2	Warehouse
Whare Hausmann	Storeman	3333	Card 3	Warehouse
Sel Ettuyu	Sales Rep	4444	Card 4	Sales
Ike Cansalla	Sales Rep	5555	Card 5	Sales

5. Badge the first training tag at the MultiProx reader. You should see an event come through in the event window similar to that shown here:

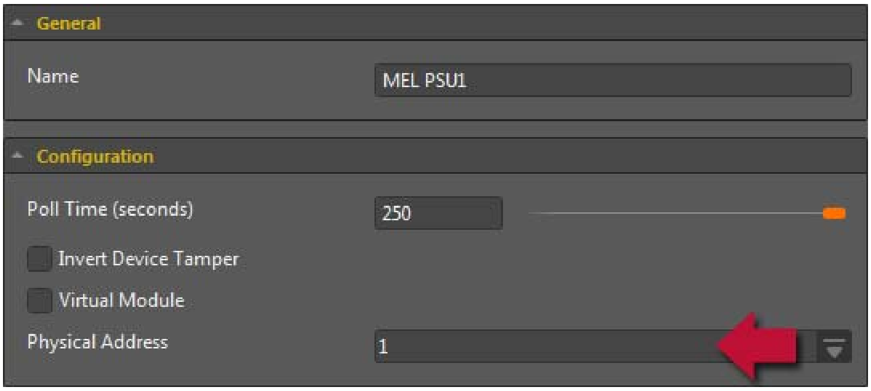


Read RD1 Raw Data Port (P1) (99:1)

6. Right click the event and select **Add Card Number to Existing User**
7. Select the user you wish to add the card to (**Manny Jah**) then click **OK.**
8. Repeat to add the remaining cards to the other users.

Task 16: Adding the Power Supply Module and Trouble Inputs

1. Navigate to **Expanders | Analog Expanders**
2. Add a new Analog Expander named **MEL PSU1**
3. Ensure the **Physical Address** is set at **1**



General

Name: MEL PSU1

Configuration

Poll Time (seconds): 250

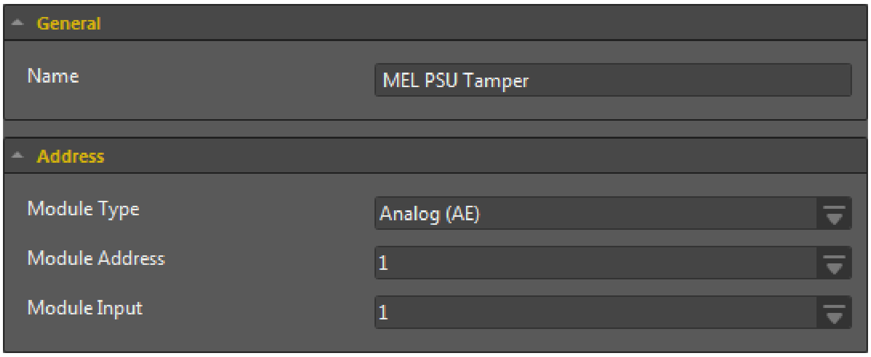
□ Invert Device Tamper

□ Virtual Module

Physical Address: 1

4. Navigate to **Programming | Trouble Inputs**

5. Add a new trouble input named **MEL PSU Tamper**
   - Set the **Module Type** to **Analog (AE)**
   - Set the **Module Address** to **1**
   - Set the **Module Input** to **1**



Name: MEL PSU Tamper

Module Type: Analog (AE)

Module Address: 1

Module Input: 1

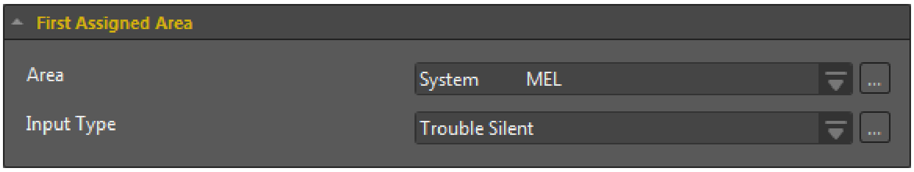
6. Add the remaining Trouble Inputs from the table as shown (excluding 7), adjusting the name and setting the Module Input number accordingly. For instance **MEL PSU Mains Failure** should be **Module Input 2**.

Input Number	Description
AExxx:01	Module Tamper
AExxx:02	Mains Failure
AExxx:03	Low Battery / Battery Failure
AExxx:04	Output Voltage Low
AExxx:05	Output Over Current Failure
AExxx:06	Core Temperature Over Temp Failure
AExxx:07	Reserved
AExxx:08	Module Offline

7. Add the new trouble inputs to the **All Trouble Inputs** Status List:
   - Navigate to **Monitoring** | **Setup** | **Status Lists** and select **All Trouble Inputs**
   - Click **Add** to open the **Select Devices** window
   - Set the **Device Type** to Trouble Zone and choose your **Controller**
   - Select the PSU Trouble Inputs and click **OK**.
8. Wire the tamper input closed.

Task 17: Adding Trouble Inputs to the System Area

1. Select all the trouble inputs (CTRL+A) then click the **Areas and Input Types** tab
2. Set the first Area to the **System** area
3. Set the first Input Type to **Trouble Silent**



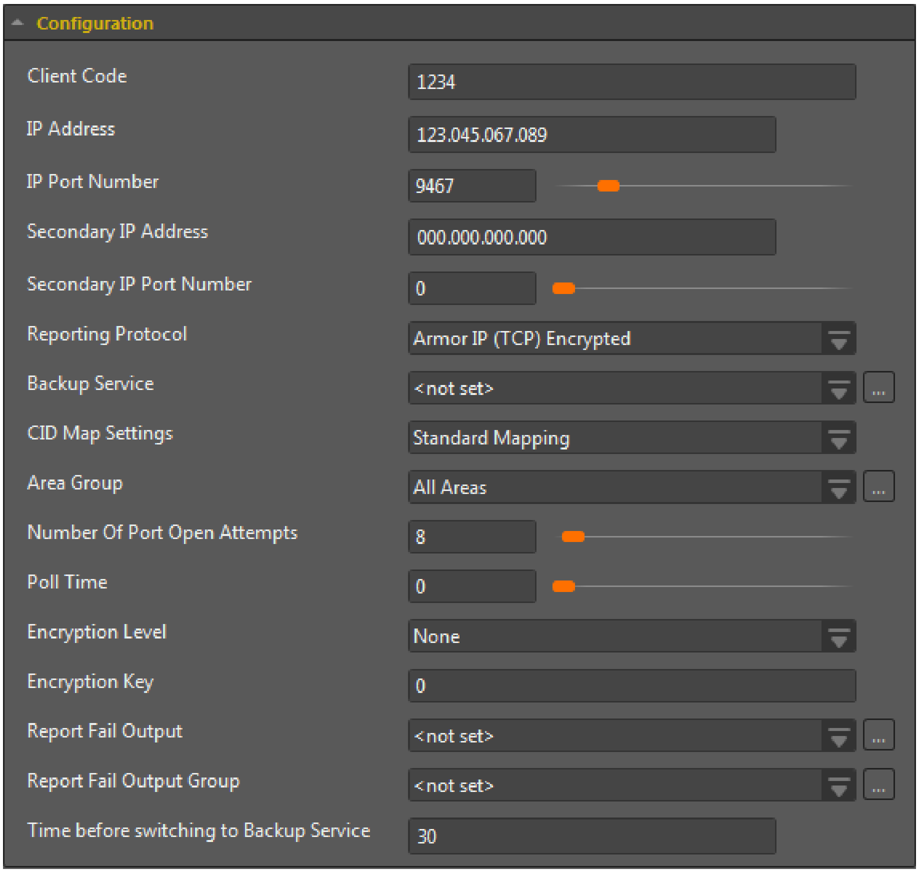
Area: System MEL

Input Type: Trouble Silent

4. Click **Save** to update the records

Task 18: Creating a Report IP Service

1. Navigate to **Programming | Services**
2. Select your Controller then click **Add** to create a new service
3. Set the **Service Type** to **Report IP**
4. Set the **Service Mode** to **Start with Controller**
5. Select the **General** tab:
   - Enter the **Client Code** (or account number). This is the code used to identify the system at the monitoring station and will usually be issued by the monitoring company. For the purpose of this exercise, we'll just use **1234**.
   - Enter the **IP Address** and **IP Port Number** of the monitoring station. As we don't have "real" connection details, we'll use the IP address of 123.45.67.89 and port 9467 for this exercise.



Configuration

Client Code	1234
IP Address	123.045.067.089
IP Port Number	9467
Secondary IP Address	000.000.000.000
Secondary IP Port Number	0
Reporting Protocol	Armor IP (TCP) Encrypted
Backup Service	<not set>
CID Map Settings	Standard Mapping
Area Group	All Areas
Number Of Port Open Attempts	8
Poll Time	0
Encryption Level	None
Encryption Key	0
Report Fail Output	<not set>
Report Fail Output Group	<not set>
Time before switching to Backup Service	30

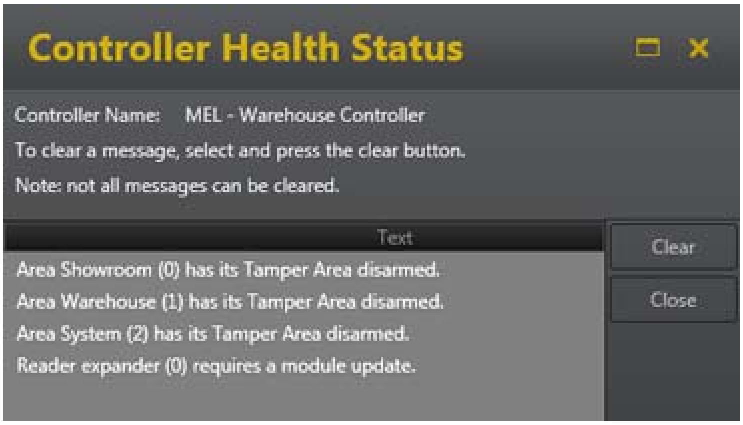
   - Set the **Reporting Protocol** to **ArmorIP (TCP) Encrypted.**

6. Select the **Options** tab and enable the reporting options for the signals to be sent by the service. For the purpose of this exercise, select **Alarms**, **Tampers** and **Restore** to report the corresponding input state changes.
7. Right click the service from the Record List and choose **Start Service.**

Task 19: Addressing Health Status

1. Navigate to Sites | Controllers
2. Right-click on the Controller and choose Get Health Status.

   The Controller Health Status window appears indicating any areas that need addressing.



Controller Health Status

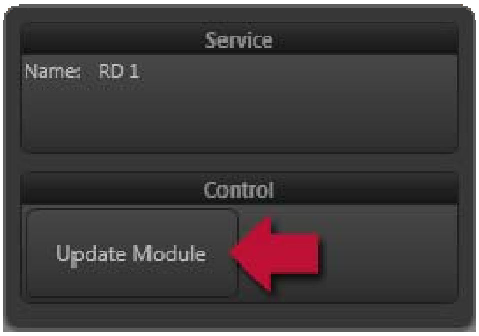
Controller Name: MEL - Warehouse Controller

To clear a message, select and press the clear button.

Note: not all messages can be cleared.

Text
Area Showroom (0) has its Tamper Area disarmed.
Area Warehouse (1) has its Tamper Area disarmed.
Area System (2) has its Tamper Area disarmed.
Reader expander (0) requires a module update.

3. Right-click the Showroom area from your Technician status page and choose Arm 24
4. Repeat with the Warehouse and System areas.
5. Navigate to Expanders | Reader Expanders
6. Right-click RD1 and choose Update Module

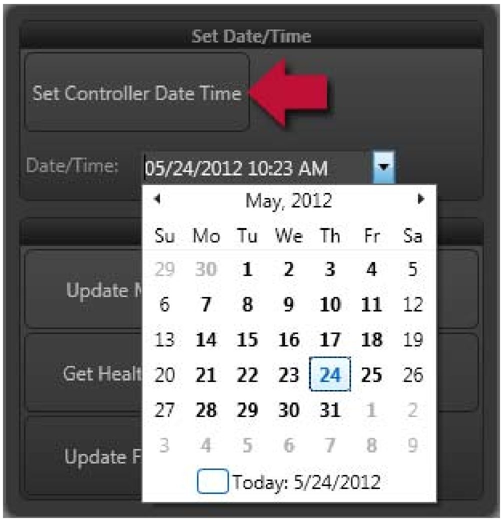


Name: RD 1

7. Once the module has finished updating, view the health status again. You should receive a message advising that there are no known issues with the Controller.

Task 20: Setting the Controller Time

1. Navigate to **Sites | Controllers**



Date/Time: 05/24/2012 10:23 AM

May, 2012

Su	Mo	Tu	We	Th	Fr	Sa
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Today: 5/24/2012

2. Right click the Controller and choose **Set Controller Date Time**.

Review Questions and Answers

In This Section

Module 101: ICT Company Profile

Where is ICT hardware produced?

- □ China
- ☑ New Zealand
- □ Canada
- □ Canada and New Zealand

Which certification applies to ICT products?

- □ UL Certification
- □ CE Compliance
- □ NIST AES256 Bit Encryption Certification
- ☑ All of the above

Where is research and development carried out?

- □ China
- □ Canada
- □ New Zealand
- ☑ New Zealand and Canada

Module 121: Protege GX Platform Introduction

Who was the GX platform built for?

- □ The Integrator
- □ The Consultant
- ☑ The End User
- □ The Distributor

What type of system is the GX platform best suited to?

- □ Single door systems
- □ Systems up to 50 doors
- □ Enterprise class systems
- ☑ All of the above

Complete this statement:

WYSIWYG Event reports are...

- □ A) Exportable to multiple formats
- □ B) A licensable feature
- □ C) An intuitive way of finding the data you want
- ☑ D) A and C

How many users are supported by the system / controller?

- □ Unlimited / Unlimited
- □ Unlimited / 2000
- □ 2000 / 2000
- ☑ Unlimited / 5 Million

Who can purchase Protege GX hardware / software?

- ☑ Integrators who have at least one Certified Protege GX Installer
- □ Integrators who maintain a predefined level of sales
- □ Integrators who are paid members of the Protege GX Installers Group
- □ All of the above

Where do certification exams take place?

- □ Web based, self paced
- □ Only at the ICT factory
- □ Supervised at the Integrators office
- ☑ Supervised at an ICT approved facility

Module 122: Protege GX Licensing

What is the license cap for doors?

- □ 250
- □ 500
- ☑ 1000
- □ Doors are unlimited

What is the maximum number of Controller licenses you will ever pay for?

- □ 250
- □ 500
- □ 1000
- ☑ Controllers are unlimited

What happens when the number of cameras reach 250?

- □ No more cameras can be added, the cap has been reached
- ☑ Cameras are now unlimited
- □ Nothing, the camera cap is 500
- □ No difference, cameras are not limited anyway

How many camera licenses are included in the base license?

- □ None
- □ 5
- ☑ 10
- □ Cameras are unlimited

Which of the following features are NOT included in the base license?

- □ Floor plans
- ☑ DVR HLI (High Level Interface)
- □ Grid View reports
- □ CSV bulk user import

How many operators can log in at the same time with a base license?

☐ As many as you like, operators are unlimited

☑ 1

☐ As many as you like, users are unlimited

☐ 10

To connect 20 PTZ cameras and have them respond to events automatically, what would be required?

☐ 10 camera licenses and a DVR HLI license

☐ 10 camera licenses, DVRs are unlimited

☑ A base license, 10 camera licenses and a DVR HLI license

☐ A base license, 20 camera licenses and a DVR HLI license

Which licensed feature(s) are required in order to enable operators to login to the Protege GX Client using their Windows credentials?

☐ An Active Directory (LDAP) Users License

☑ An Active Directory (LDAP) Operators License

☐ A Concurrent Operator Connection License

☐ All of the above

Which license would I require for a system with 100 IP Doors?

☐ A base license and 50 Door licenses

☐ A base license and 100 Door licenses

☑ A base license and 100 IP Door licenses

☐ A base license, 100 IP Door licenses and 50 Door licenses

To what is the Protege GX license bound?

☐ The Integrator

☐ The Site

☑ The Server

☐ The Protege GX database

Which of the following circumstances would NOT require a license update?

☑ Restoring an old Protege GX database

□ Adding 150 door licenses

□ Replacing the server motherboard

□ Upgrading Windows on the server

Do you need to have Internet access to update your license?

□ No, you can do a manual license update

□ Yes, the automatic license update connects to the ICT licensing server via the internet

☑ Yes, even with a manual license update, you will need internet access somewhere to upload the license request and download the license file

□ No, the proxy server can provide your license update

Which of these statements is NOT correct?

□ An SMA provides access to new features, updates, enhancements and fixes

☑ An SMA is an agreement between ICT and the Integrator

□ The end user must purchase their SMA from an ICT approved Integrator

□ An SMA provides priority access to technical support

If an SMA expired 30 months ago, how much would it cost to renew?

□ It will be 25% of the current cost of the entire license x 1 year

□ It will be 25% of the current cost of the entire license x 2 years

☑ It will be 25% of the current cost of the entire license x 3 years

□ It will be the same cost as a new license

Calculate the following:

If you had a system with a base license and a total of 1050 doors, how much would an SMA cost if the base license was $1000, and door licenses were $1000 for 50?

□ $5500.00

□ $5250.00

☑ $5000.00

□ $4500.00

Module 123: Protege GX System Architecture

Which database are events stored in?

- □ On the Controller only. The server interrogates the Controller for reports.
- □ The Protege GX database located on the Server.
- ☑ The Protege GX Events database located on the Server
- □ The reports database

What does the Protege GX database contain?

- □ Controller configuration only
- □ Global system configuration only
- ☑ The configuration for the entire system
- □ The configuration and events for the entire system

Can the GX Controller run in standalone mode?

- □ Yes, Protege GX is a controller based system. The Server is only used to program the Controller.
- ☑ Yes, Protege GX is a Server based system but Controllers will run stand-alone once configured.
- □ No, Protege GX is a Server based system and must have a network connection between the Controller and Server at all times.
- □ No, the Protege GX Controller stores its configuration database on the server.

The Protege GX Client Software...

- □ can be installed on only one PC if you only have a base licence
- □ is only installed on the Server if you only have a base licence
- ☑ can be installed on any number of workstations
- □ is never installed on the server

When making configuration changes...

- □ The GX Client makes changes to the Controller directly
- ☑ The GX Client makes changes to the Protege GX Database
- □ The GX Client makes changes to the Protege GX Database and Controller
- □ The GX Client is not used

What does the GX Client software communicate with?

☑ The server only

□ The server for system configuration and reports, and the controller for status updates

□ The controller for configuration and reports, and the server for status updates

□ None of the above

Which of the following statements is correct?

☑ Controllers can communicate with the GX Server using the Internet

□ Controllers must be on the same local area network as the GX Server

□ Controllers must be on the same corporate network as the GX Server

□ Controllers cannot communicate with the GX Server using the Internet

How does the Controller communicate with the server?

□ Using the RS-485 module network

☑ Using TCP/IP on an Ethernet network

□ Using the RS-232 serial interface

□ Using Point to Point Protocol over Ethernet (PPPoE)

What type of site/system was Protege GX built for?

□ High end residential sites

□ Single controller commercial sites

□ Enterprise scale systems

☑ All of the above

Which of the following is NOT a reason for making GX a server-based system?

☑ Storing system configuration on a server allows more data to be stored

□ Configuration changes can be easily made to the system, then the system manages which Controllers need to be updated

□ It helps to keep system information confidential

□ It means there is a single point for all configuration changes

Complete this statement...

Where budget constraints on a small single Controller site mean an onsite server can't be justified...

- □ ...Protege GX is not a suitable solution
- □ ...the GX Controller should be programmed using a technicians laptop
- ☑ ...connect the Controller to a shared server using the Internet
- □ ...use any old existing PC as the server

Module 124: Protege Hardware Overview

How many access controlled doors can be directly connected to the DIN Rail Controller?

- □ 0
- □ 1
- ☑ 2
- □ 4

How many onboard high current relay outputs does the DIN Controller have?

- ☑ 2
- □ 4
- □ 7
- □ 500+

How many onboard inputs does the RDM2-DIN Reader Expander have?

- □ 7
- □ 6
- ☑ 8
- □ 4

If installing a system with two doors (both with readers for entry and exit), how many Reader Expanders are required?

- □ Two. Each Reader Expander has two reader ports onboard.
- □ One. With reader multiplexing, a single Reader Expander can support two doors with entry and exit readers.
- ☑ None. The Controller supports reader multiplexing, which allows two doors with entry and exit readers to be controlled onboard.
- □ One. The Controller has two reader ports onboard so a reader expander is required for the other two readers.

Which of the following offsite reporting paths are supported by the DIN Rail Controller?

- □ IP Reporting via the Ethernet port
- □ Contact ID via the built in dialer
- □ SIA via the built in dialer
- ☑ All of the above

How many onboard reader ports does the PCB Controller have?

- □ 0
- □ 1
- ☑ 2
- □ 4

How many onboard readers does the PCB Controller support?

- □ 0
- □ 1
- □ 2
- ☑ 4

What's the most RDM2-PCBs you can fit in a Jumbo Cabinet?

- □ 1
- □ 2
- □ 4
- ☑ 8

What is the maximum distance that the Protege Module Network may be run?

- □ 100m
- ☑ 900m
- □ 1200m
- □ 1500m

A project requires a run of 300m (1000ft) between the Controller and the nearest Ethernet switch. Which cable type should I use?

- ☑ You can't - the maximum cable run between a Controller and a switch is 100m (328ft)
- □ Belden 9842 or 24AWG security cable
- □ Belden 9842 or CAT5e
- □ Belden 9842

In a new installation, how many spurs can come off a Controller on the RS-485 module network?

□ 3

□ 4

□ 250

☑ None - star or spur wiring is not an acceptable method for new installations

Can multiple power supplies be connected to the Protege Module Network?

□ No, the Module Network must only be powered at one location

☑ Yes, as long as the N+ connection is removed between the split sections

□ Yes, as long as they are all in the same cabinet

□ Yes, as long as they are all in different cabinets

If a door needs to operate in card and PIN mode, which reader should be used?

□ The Nano Prox reader

☑ The Multi Prox reader

□ The Vario reader

□ The Vario PIN reader

If an ICT reader is connected to an ICT reader expander, is tamper monitoring possible?

☑ Yes, ICT readers and expanders can be programmed for intelligent tamper recognition.

□ Yes, ICT readers include a tamper switch.

□ Yes, ICT reader expanders include a tamper input.

□ No, there is no tamper monitoring on ICT readers.

What is the maximum cable run for an ICT reader connected to an RDM2-DIN Reader Expander?

□ 75m

□ 100m

□ 125m

☑ 150m

How many onboard controllable outputs does the PRT-KLCD have?

- □ None
- □ 1 low current output
- □ 1 low current output and two controllable LEDs
- ☑ 1 low current output, two controllable LEDs and a controllable buzzer

How many inputs does a PRT-KLCD keypad have onboard?

- □ None
- □ 1 input (2 using zone duplex)
- ☑ 2 inputs (4 using zone duplex)
- □ 4 inputs (8 using zone duplex)

What is the ATH1 module used for?

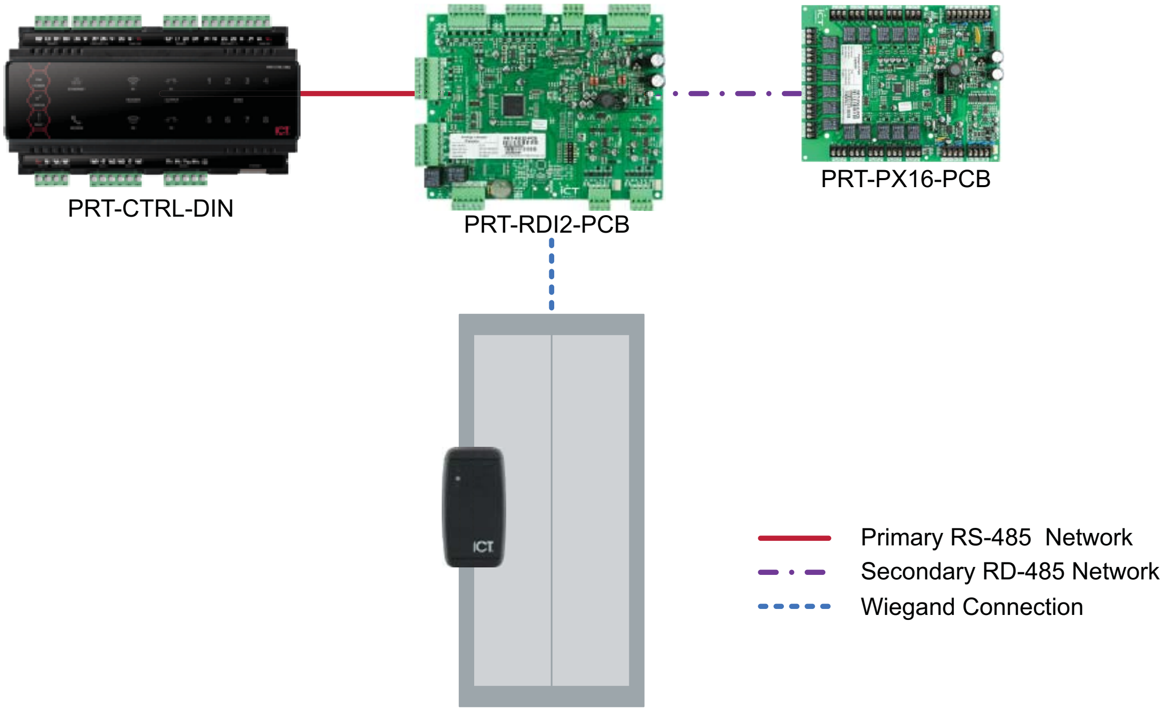
- □ Arming and disarming areas
- ☑ To measure temperature and humidity
- □ Reading smart cards
- □ Programming smart cards

Complete this statement

Gear plates must be used in...

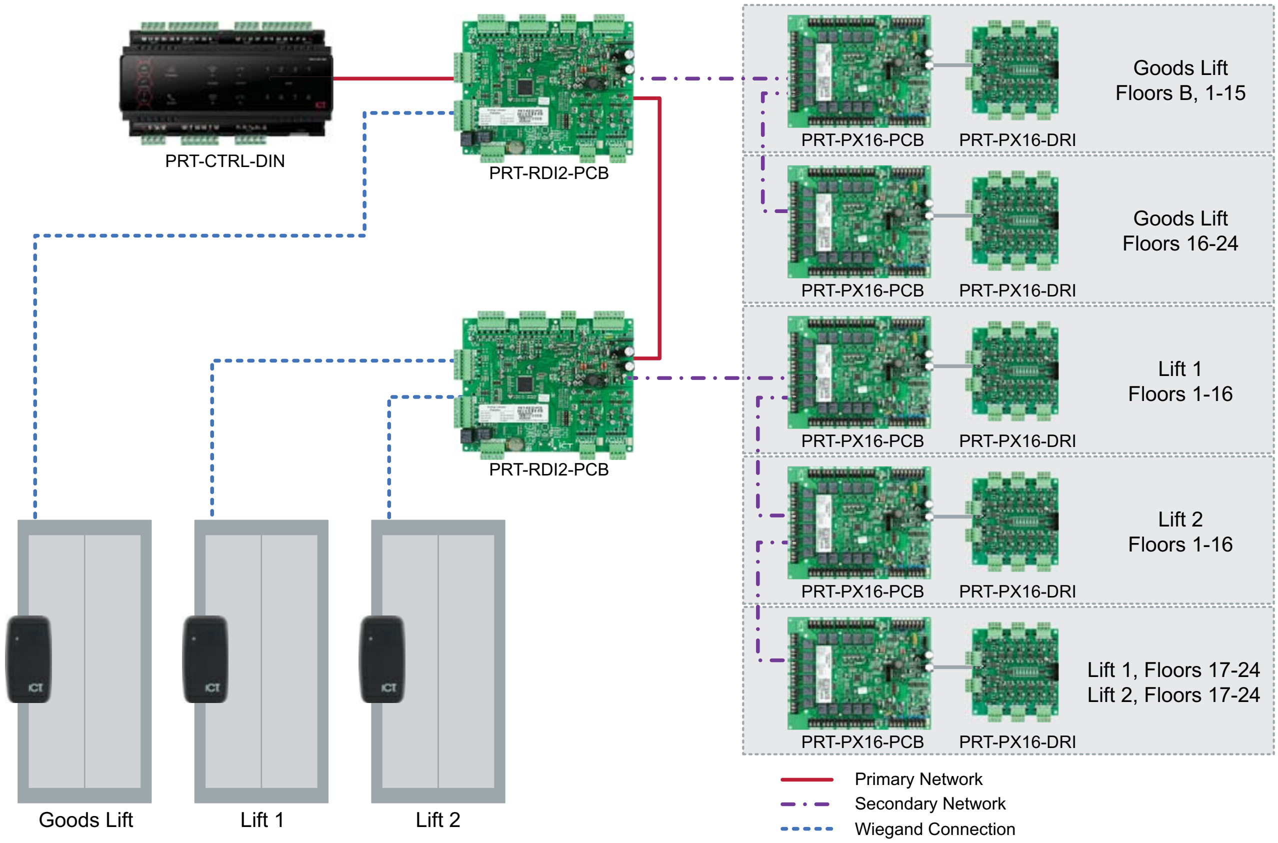
- □ Large and Jumbo cabinets
- ☑ Fatboy and Jumbo cabinets
- □ Medium and Large cabinets
- □ Fatboy and Large cabinets

With a single car elevator system configured as shown, what is the maximum number of floors that could be controlled?



- □ 8
- ☑ 16
- □ 128
- □ Unlimited

In addition to basic access control, what optional feature is also shown in this scenario, and what is it for?



□ Direct Reader Interface, allowing a high level interface to the lift control system

□ Destination reporting, which allows Protege to see which floor an elevator car is on

☑ Destination reporting, to prevent more than one floor being selected when a card is badged

□ Destination reporting, allowing connection to a destination based elevator control system

Module 126: Limitations of SE Hardware in Protege GX

Can an RDM2-PCB Reader Expander be connected to a DIN Controller on a GX System?

☑ Yes, it is fully supported

□ No, it is only compatible with a PCB Controller

□ Yes, but it requires a firmware upgrade

□ No, it is only compatible with SE systems

When running GX with a PCB Controller, what greeting would 'Gordon Groves' see at a keypad if he was user number 4999?

☑ Good Morning User 4999

□ Good Morning Gordon Groves

□ Nothing, only 2000 users are supported by the PCB Controller on GX

□ Protege GX By ICT

When running GX with a PCB Controller, what is the maximum number of users it can store?

□ 5 million

☑ 5000

□ 2000

□ 10000

How many doors can be assigned to an access level on a GX system running on a PCB Controller?

☑ None, this is not supported by the PCB Controller

□ 2

□ 4

□ 8

If a Controller limitation is exceeded, what happens?

□ Nothing, the Controller ignores anything it can't fit or doesn't know about.

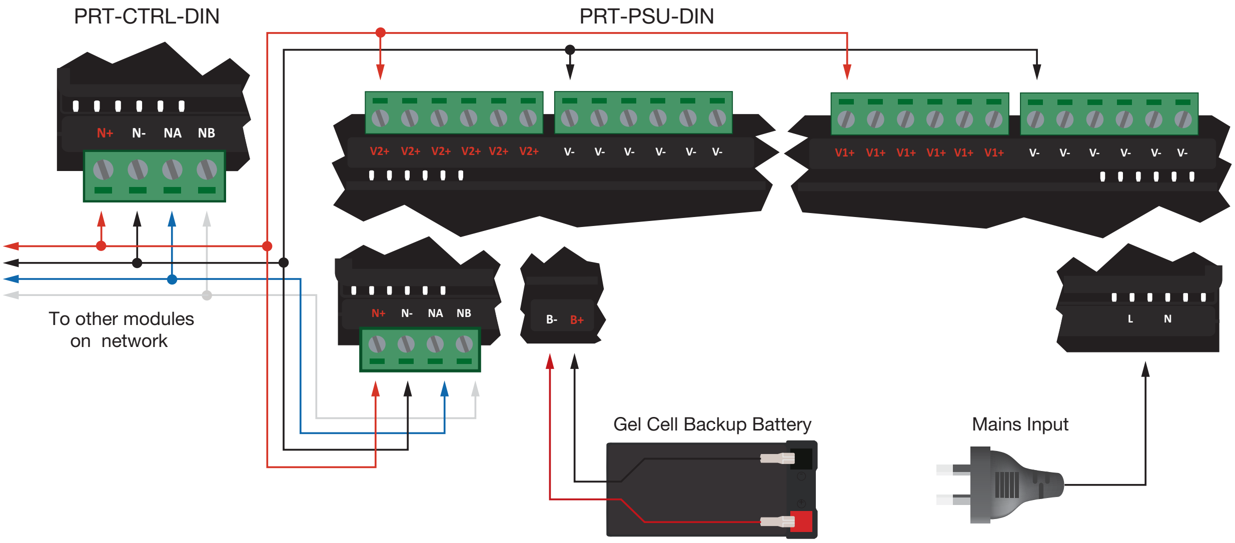
□ The server displays an error.

□ The Controller fault light comes on solid and the status light flashes three pulses.

☑ The Controller sends a System Assertion event to the Server.   The server displays a message in the Controllers Health Status

Module 127: Protege DIN Rail Hardware Configuration

In the configuration shown, what is the maximum continuous load that can be drawn by the module network?



☑ 4 Amps

□ 10 Amps

□ 3.3 Amps

□ 3 Amps

To monitor a cabinet tamper switch using a dedicated tamper input, which module is required?

☑ PRT-PSU-DIN Power Supply

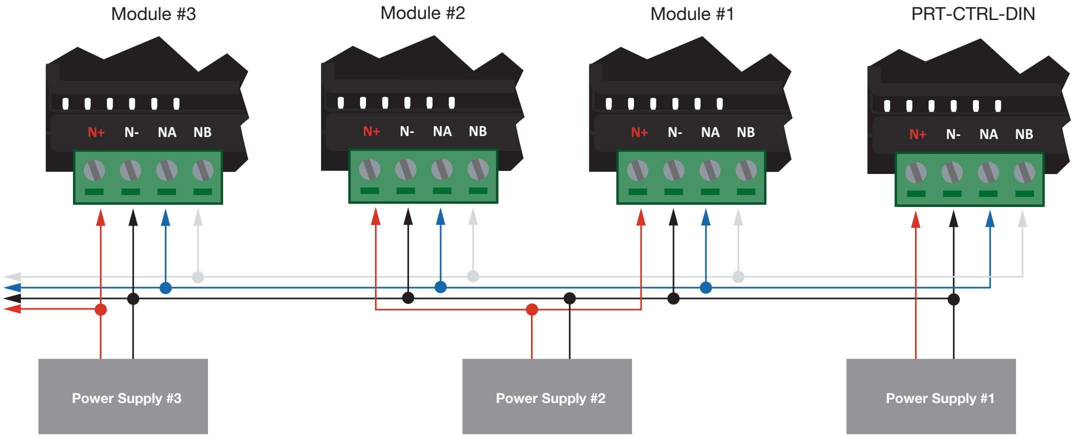
□ PRT-CTRL-DIN Controller

□ PRT-ZX16-DIN Zone Expander

□ PRT-RDM2-DIN Reader Expander

Is the wiring method shown in this diagram acceptable?

Assume the power supplies indicated in the diagram shown are DIN Rail PSU's. Is this an acceptable wiring method? If so, what is the maximum **recommended** average current that the Controller could draw?



☐ This is an unacceptable wiring method

☑ Acceptable, 3 Amps

☐ Acceptable, 9 Amps

☐ Acceptable, 4 Amps

Where and when should a diode be fitted?

☐ Across the coil when a coil is being controlled

☐ Across the lock when a lock is being controlled

☐ Across the relay when a relay is being controlled

☑ All of the above

Where does the shield of the cable connected to a reader get connected?

☐ Frame grounded at one point. Connected to the reader shield.

☐ Wired to V- at the Reader Expander. Connected to the reader shield.

☐ Card reader cable is not shielded.

☑ Frame grounded at one point. Not connected to the reader shield.

What does a constant red fault indicator mean?

☐ The Module is in identification mode

☐ Module communications activity

☑ The module is in error state. The status light will flash an error code.

☐ The module is in boot mode awaiting firmware

What does a continuous fast green flash of the status indicator mean?

- □ The Module is in identification mode
- □ There is Module communications activity
- □ The Module is online
- ☑ The Module is attempting to register with a Controller

The Bell indicator on a DIN Controller is flashing two green flashes.   What does this mean?

- □ The Bell output is off. The circuit to the bell is ok.
- ☑ The Bell output is off. The circuit to the siren / bell is cut, damaged or tampered.
- □ The Bell output is on. The circuit to the bell is ok.
- □ The Bell output is on. The circuit is in over current protection.

What does a flashing green indicator on an input mean?

- □ The input is in an open state
- □ The input is in a closed state
- □ The input is in a tamper state
- ☑ The input is in a short state

Module 130: Protege GX Hardware Setup

How do you default a DIN Rail Controller?

- □ Use the web interface to connect to the Controller, then click on Restart
- ☑ Wire a link between D0 and L1 of reader port 2, then cycle power
- □ Turn on DIP switch 4, then cycle the power
- □ Log in at a keypad, then select [Menu] [4] [2] [2] [Enter]

If the IP address of a DIN Rail Controller is unknown, how can you find it?

- □ Turn DIP switch 3 on, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222
- ☑ Connect a keypad, press [Menu] [4] [Arm], then scroll down three times
- □ Use the web interface to browse to the default IP address of 192.168.1.2
- □ Connect a link from L1 to D0 on reader port 2, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222

What is the default IP address of a DIN Rail Controller

- ☑ 192.168.1.2
- □ 192.168.1.3
- □ 192.168.111.222
- □ 255.255.255.0

When the IP address of a Controller is changed, what additional step(s) must be taken?

- □ Perform a module update
- □ Save the settings
- □ Cycle power to the Controller
- ☑ Save the settings, then restart the Controller

If the IP address of a PCB Controller is unknown how can you find it?

- □ Turn DIP switch 3 on, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222
- □ Connect a keypad, press [Menu] [4] [Arm], then scroll down three times
- ☑ Either of the above
- □ Connect a link from L1 to D0 on reader port 2, then cycle power to the Controller to temporarily set the IP address to 192.168.111.222

How do you access Telnet for the first time on a Windows 7 PC?

□ Start > Run, type CMD and press [Enter], then type telnet [Controller IP] 10001

☑ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Client

□ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Server

□ Control Panel > Programs > Turn Windows Features On or Off then check (enable) Telnet Server and Telnet Client

What is the default IP address of a PCB Controller?

☑ 192.168.1.2

□ 192.168.1.3

□ 192.168.1.100

□ 192.168.111.222

How is the module address set on a Protege LCD keypad?

□ Using DIP switches

☑ From the Keypad Configuration Menu: [X] at version info during power up

□ From the Keypad Configuration Menu: [Menu], [4], [Arm] once the system is operational

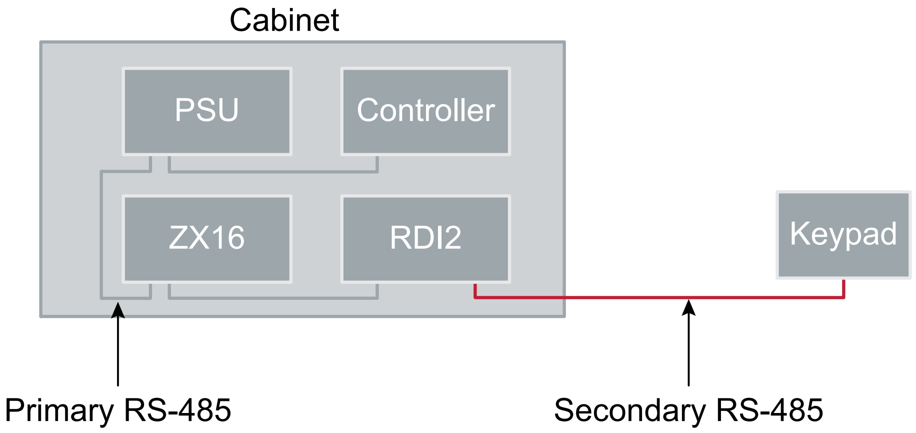
□ Using the Module Address tool from within the GX software

Module 125: Protege GX System Design

Where should copper clad aluminium cables be used?

- ☐ For Reader connection
- ☐ For RS-485 Module Network connection
- ☐ CCA cables should be used wherever possible due to its higher attenuation
- ☑ The use of CCA cables should be avoided

If the keypad cable was damaged, causing a short across all conductors, what would happen?



- ☐ The Keypad would stop functioning. The RDI2 would stop functioning. Everything else would continue to function properly.
- ☑ The Keypad would stop functioning. Everything else would continue to function properly.
- ☐ Everything would continue to function properly.
- ☐ The Keypad would stop functioning. The RDI2 would go into offline mode. Everything else would continue to function properly.

In Offline Operation...

A front door of a retail shop is connected to an RDI2-DIN intelligent reader expander which is programmed for 'First 10 Users + Cache' mode. The door is programmed to unlock at 9am and lock at 5 pm. Jane, one of the shop staff, is programmed as User 202. If the expander was to go offline at 5am, what would happen?

- ☐ The door would not unlock at 9am. Jane would be granted access.
- ☐ The door would not unlock at 9am. Jane would not be granted access.
- ☑ The door would unlock at 9am. Jane would be granted access.
- ☐ The door would unlock at 9am. Jane would not be granted access.

What happens to...?

A lighting circuit is connected to an output on a PX8-DIN module that is programmed to turn on at 8pm and off at 5am. The expander goes offline at 4am, then comes back online at 10am. What happens to the lights after the expander goes offline?

- □ The lights turn off at 5am.
- ☑ The lights turn off at 10am.
- □ The lights turn off at 4am.
- □ The lights turn off at 5am the following day.

What happens when...?

If a door is connected to an RDM2 that has been programmed for 'No Users' offline operation, and the module has gone offline, what happens when a user requests exit using a REX button?

- □ The door is unlocked. The reader does not beep.
- □ The door is not unlocked. Four short beeps are given at the reader.
- □ The door is not unlocked. The reader does not beep.
- ☑ The door is unlocked. Four short beeps are given at the reader.

Module 128: Protege GX Software Installation

Which of the following operating systems are NOT supported for server installations?

☑ Microsoft Windows XP SP3

□ Microsoft Windows Vista SP2

□ Microsoft Windows Server 2008 R2

□ All of the above systems are supported

Which database version is recommended?

☑ SQL Server 2008 R2

□ MySQL Server Enterprise Edition

□ MySQL Server Express Edition

□ SQL Server 2005

What are the minimum CPU and RAM requirements for a Protege GX Server?

□ Intel Atom 1.66GHz, 2GB RAM

☑ Intel Dual Core 2.8GHz, 4GB RAM

□ Intel Dual Quad 2.8GHz, 8GB RAM

□ Intel Xeon E5620, 2GB RAM

Module 129: Protege GX Software Introduction

After a configuration change, how long must you wait before the changes take effect?

- □ Protege GX is a server based system so changes take effect immediately
- □ 60 Seconds
- □ The changes won't take effect until you connect to the Controller and download to it
- ☑ Up to the time that is set in 'Download Retry Delay' under the Controller Configuration tab

After restoring a database and starting the Data Service what additional step(s) must be taken?

- □ Confirm your configuration is correct.
- ☑ Confirm your configuration is correct. Start the Download Service.
- □ Confirm your configuration is correct. Start the Download Service. Default your Controller.
- □ No additional steps are required as the Database would not restore if the configuration was incorrect.

Which service is responsible for incoming messages?

- □ The Update Service
- □ The Data Service
- □ The Download Service
- ☑ The Event Service

What does the Details button on the History tab do?

- □ It shows the date/time and operator that modified the record
- □ Runs a detailed event report on the record
- ☑ It shows the old and new values of fields that were modified
- □ None of the above

What does the Breakout button do?

- ☑ Opens the current page in another window
- □ Switches to the Alarms page
- □ Exits the software
- □ Closes the current window

What is the Refresh button used for?

- □ To clear the filtered results when using the Find tool
- □ To update data when a second client window has been used to configure something
- □ To update data when another operator may have made changes to the same record
- ☑ All of the above

What is the Events tab in the Programming window used for?

- □ To load events for the selected record
- □ To load events for the selected record and run a report on these events
- □ To show which fields were modified and their old and new values
- ☑ To load events for the selected record, run a report on these events or copy the events to the Windows Clipboard

What is the maximum capacity of SQL Server 2005 Express or SQL Server 2008 Express Database?

- □ 32 Million events
- ☑ 4GB
- □ Unlimited
- □ 10GB

What must you do to prevent the SQL Express event database from reaching its capacity?

- □ Periodically delete some events from SQL
- □ Purchase a larger hard drive
- ☑ Enter a timeframe in the 'Purge Events' field in Global settings
- □ Create an event filter that limits the number of events saved

Where should your database backup be stored?

- ☑ Offsite if possible
- □ In the default location of C:\Program Files\Microsoft SQL Server\MSSQL10_50.PROTEGEGX\MSSQL\Backup
- □ On a second internal hard drive
- □ On a USB thumb drive

Module 131: Hardware Programming

A module update is required when...

- □ You change any settings on the expander
- □ You change any programming
- ☑ The Controller advises it is required via the health status
- □ All of the above

What does the Controller Wizard do?

- □ Adds a Controller
- □ Adds expanders, inputs, outputs, trouble inputs
- □ Links all of the associated records
- ☑ All of the above

What steps are required to use the Controller onboard reader ports?

- □ None. Door processing is enabled by default
- ☑ Assign a Reader Expander address in the Controller Configuration tab and select the lock outputs to use
- □ Assign a Controller address in the Reader Expander Configuration tab and select the lock outputs to use
- □ Turn DIP switch 4 on

What does it mean if an address is shown in red in the Auto- Addressing window?

- ☑ The address has been changed but not updated
- □ The address can't be changed using Auto-Addressing
- □ The address is outside the Controllers address space
- □ The address is at factory default of 254

Which of the following will generate a Controller Health Status message?

- □ A low battery on a power supply
- □ Failure to communicate
- ☑ When encryption is disabled
- □ All of the above

If Controller encryption is accidentally disabled, what additional step must be carried out to get the Controller back online?

☑ The Controller must be defaulted to clear the encryption key

□ Controller encryption should be enabled again

□ Controller encryption should be initialized again

□ Nothing. If encryption is disabled at the Server, the Controller will continue to communicate

Answer the following...

On a site where encryption between the Controller and Server is normally enabled, a Controller is defaulted. The Controller does not come back online.

What additional step must be carried out to get the Controller back online?

□ Encryption must be disabled for the Site

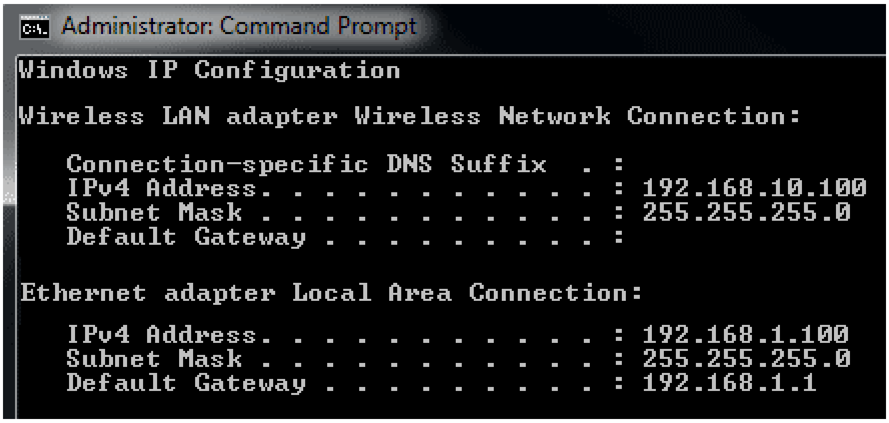
□ Encryption must be re-initialized on the Controller

☑ Encryption must be disabled for the Controller

□ A force download is required to push the existing encryption key out to the Controller

What is the correct Event Server IP address?

Assuming the screenshot shown is from the Protege GX Server.



```
Windows IP Configuration

Wireless LAN adapter Wireless Network Connection:

   Connection-specific DNS Suffix  . :
   IPv4 Address. . . . . . . . . . . : 192.168.10.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

Ethernet adapter Local Area Connection:

   IPv4 Address. . . . . . . . . . . : 192.168.1.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

What should a Controller with the IP address 192.168.10.2 have set as its Event Server IP address?

□ 192.168.10.1

☑ 192.168.10.100

□ 192.168.1.1

□ 192.168.1.100

Module 132: User Management

What are Access Levels used for?

- □ To control which elevator levels they have access to
- ☑ To control what users can do, where they can go and when they can do these things
- □ To control how a door responds to a user
- □ To provide a way to rank users

In an Access Level, what are Door Groups used for?

- ☑ They define which doors a user has access to
- □ They allow a number of doors to be unlocked with a single card read
- □ They are used for scheduling multiple doors to unlock
- □ They define which Area a door belongs to

What happens if the Import Users Wizard has an Access Level mapped that doesn't exist in the Protege GX database?

- □ The wizard will crash
- □ The wizard will skip the user
- □ The wizard will import the user but leave the Access Level unset
- ☑ The wizard will import the user and create a new Access Level to match

What must you do to ensure a schedule does not operate on a holiday?

- □ Nothing. By default, the schedule will not operate on a holiday.
- ☑ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Disabled on Holiday'.
- □ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Enabled on Holiday'.
- □ Program the holiday into a holiday group. Apply that holiday group to the schedule. Program the holiday mode of the applicable periods to 'Ignore Holiday'.

How do you program a schedule to run from 11pm on Monday through to 2am on Tuesday?

- □ Program period 1 from 23:00 to 00:00 and check Monday. Program period 2 from 00:00 to 02:00 and check Monday and Tuesday.
- □ Program period 1 from 23:00 to 23:59 and check Monday. Program period 2 from 00:01 to 02:00 and check Tuesday.
- ☑ Program period 1 from 23:00 to 00:00 and check Monday. Program period 2 from 00:00 to 02:00 and check Tuesday.
- □ Program period 1 from 23:00 to 23:59 and check Monday. Program period 2 from 00:01 to 02:00 and check Monday and Tuesday.

How do you program a schedule to be valid from 09:00 to 17:00 Monday to Friday if the day is not a holiday?

- ☑ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Disabled on Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Enabled on Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Select 'Ignore Holiday'.
- □ Program period 1 from 09:00 to 17:00 and check Monday-Friday. Program a qualify output for holidays.

How do you program a schedule to be valid from 09:00 to 17:00 on normal days and 10:00 to 16:00 on holidays?

- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Enabled on Holiday' and the 10:00-16:00 period to 'Disabled on Holiday'.
- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Ignore Holiday' and the 10:00-16:00 period to 'Enabled on Holiday'.
- □ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Ignore Holiday' and the 10:00-16:00 period to 'Disabled on Holiday'.
- ☑ Program two periods. Set the holiday mode of the 09:00-17:00 period to 'Disabled on Holiday' and the 10:00-16:00 period to 'Enabled on Holiday'.

Module 133: Basic Intruder Detection

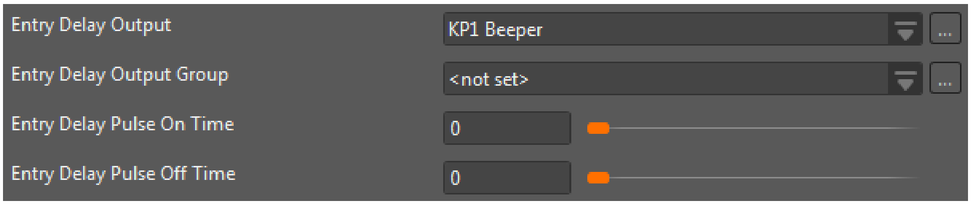
A short time after creating a new area, a health status message appears on the controller. What is this likely to be?

- □ The area is missing an Input Type
- □ The Controller requires a module update
- ☑ The new area has its Tamper or 24 hour area disarmed
- □ The area has no inputs programmed yet

Which characters from the area name programming will be shown on the keypad?

- □ The last 16 characters of the programmed name
- □ The first 20 characters of the programmed name
- □ The last 20 characters of the programmed name
- ☑ The first 16 characters of the programmed name

Explain the result of the setting shown in this image



Entry Delay Output	KP1 Beeper
Entry Delay Output Group	<not set>
Entry Delay Pulse On Time	0
Entry Delay Pulse Off Time	0

- □ The output will never be activated as the pulse times are both set to 0
- ☑ The output will be activated constantly when an entry delay input is triggered
- □ The output will be activated constantly while the area is arming
- □ The output will pulse rapidly while the area is arming

How many areas can an input be programmed to?

- □ One
- □ Two
- ☑ Four
- □ It depends on whether it is on a Reader Expander

What does the Input Type setting do?

- ☑ It sets how the input operates in the specified area
- □ It sets how the input operates in all areas
- □ It sets the Input name displayed in the keypad
- □ It sets whether input to use for an on-board expander

Which of the default input types should be used for a PIR that is covering the keypad at the main entry?

- □ Instant
- ☑ Delay
- □ Trouble Silent
- □ 24 Hour Alarm

Module 134: Basic Access Control

If a door has been created by the Add Controller Wizard with no additional configuration and it is the Forced Open state, which input must be open?

□ The REN (Request to Enter) Input

□ The REX (Request to Exit) Input

□ The Bond Sense (Lock State) Input

☑ The Door Sense (Reed) Input

Which inputs are configured by default as bond sense (lock state) inputs on a Reader Expander?

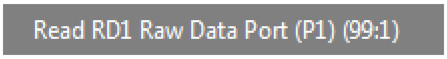
□ 1 and 5

□ 2 and 6

☑ 3 and 7

□ 4 and 8

What does this event mean?



Read RD1 Raw Data Port (P1) (99:1)

□ A card has been read that was programmed incorrectly at the factory

□ The Reader Expander has the wrong format programmed

□ A new card has been assigned to a user

☑ An unknown card has been read on Port 1

If a new area is created but it is not added to any area groups, who will be able to disarm it?

□ Nobody

□ The Installer

□ The Manager

☑ Anyone with the 'All Areas' disarming area group

If a new door is created but it is not added to any door groups or access levels, who will have access to it?

□ The Installer

☑ Anyone with the 'All Doors' door group

□ Nobody

□ The Manager

If a user is automatically logged out of a keypad after a period of time, which option do they NOT have checked in their menu group?

□ Installer (4)

□ Advanced Installer (4, 8)

☑ Installer Menu Group

□ Time (6)

What do Door Types do?

□ They define which lock outputs to use

□ They set double badge arming

☑ They define the reading mode used to gain access

□ All of the above

For Offline Operation on a Reader Expander to allow a cached user through a door in offline mode, what items must be configured?

☑ The Controller must have the Enable Automatic Offline Download option checked and the Reader Expander offline operation mode must be set to First 10 Users + Cache

□ The Reader must be programmed for Intelligent offline mode and the user must have the Super Rights option checked

□ The Reader must be programmed for Intelligent offline mode and the Reader Expander offline operation mode must be set to First 10 Users + Cache

□ The Controller must have the Enable Automatic Offline Download option checked and the user must have the Super Rights option checked

Two Readers are going to be wired to Port 1 of a Reader Expander. To configure multiplexing, what must be done?

□ The exit reader must have D0 wired to reader port 2 and Multiple Reader Input Port 1 must be checked

□ The exit reader must have D0 wired to reader port 2 and Multiple Reader Input Port 2 must be checked

☑ The exit reader must have D1 wired to reader port 2 and Multiple Reader Input Port 1 must be checked

□ The exit reader must have D1 wired to reader port 2 and Multiple Reader Input Port 2 must be checked

Module 135: Integrating Intruder Detection and Access Control

Which of the following is a good example of where a Qualify Output should be used to validate a schedule?

☑ To change a Doors entry reading mode when an area is armed

□ To keep a door locked on a holiday

□ To turn on the keypad red LED when an area is armed

□ To unlock a door when an area is disarmed

To enable automatic disarming of an area when access to a door is granted, which of the following must be configured?

□ Area Inside Door (Set in door programming) and Disarm Users Area On Valid Card (Set in reader expander programming)

□ Reader One Arming Mode (Set in reader expander programming) and Disarm Users Area On Valid Card (Set in reader expander programming)

☑ Area Inside Door (Set in door programming) and Disarm Area For Door On Access (Set in reader expander programming)

□ Reader One Arming Mode (Set in reader expander programming) and Disarm Area For Door On Access (Set in reader expander programming)

If the first door on a reader expander has in and out readers, which of the following statements are correct?

□ D0 of the entry reader must be wired into D0 of reader port 2

□ D1 of the entry reader must be wired into D1 of reader port 2

□ D0 of the exit reader must be wired into D0 of reader port 2

☑ D1 of the exit reader must be wired into D1 of reader port 2

Module 136: System Monitoring

How many areas can a trouble input be assigned to?

- □ 1
- ☑ 4
- □ None - Trouble inputs are automatically assigned to the System area
- □ None- Trouble inputs are automatically assigned to the Trouble area

When do you need to set a Reporting ID for a Trouble Input?

- ☑ Only if you want to use a different Reporting ID from the default reporting map
- □ Only if you need offsite monitoring for that trouble input
- □ Always
- □ Never

When manually adding a trouble input, where can you find the Module Address to use for a particular trouble input on an expander?

- □ You can assign any address as long as it is within the memory profile
- ☑ In the installation manual for the expander module
- □ Trouble inputs don't have a module address
- □ The server automatically assigns the next free module address

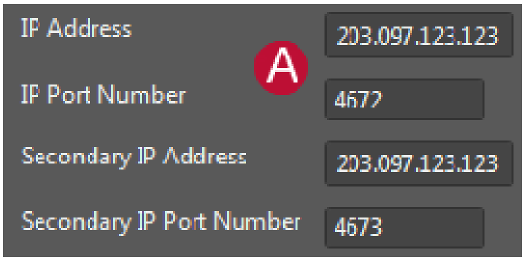
Which of the following statements about offsite monitoring are true?

- □ Contact ID is supported on all ICT Controllers with onboard dialer
- □ All ICT Controllers support IP monitoring onboard
- □ SIA is supported on all ICT Controllers with onboard dialer
- ☑ All of the above

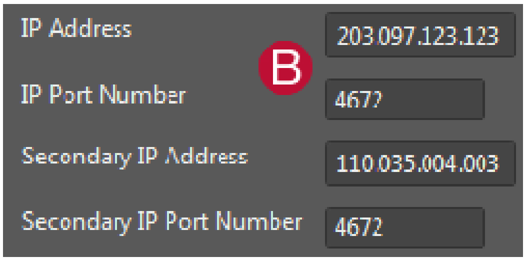
Which of the following things can Contact ID transmit?

- □ The account number that identifies the site
- □ The type of event that has occurred
- □ The area that the event occurred in
- ☑ All of the above

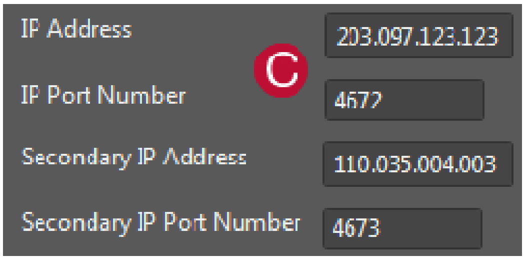
Which of these configuration examples are valid for IP Monitoring?



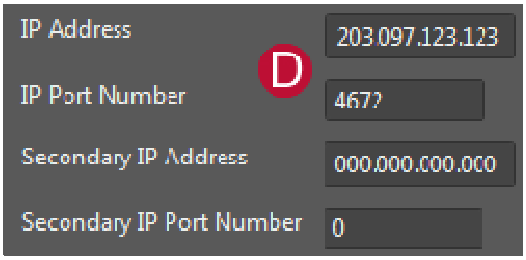
IP Address	203.097.123.123
IP Port Number	4672
Secondary IP Address	203.097.123.123
Secondary IP Port Number	4673



IP Address	203.097.123.123
IP Port Number	4672
Secondary IP Address	110.035.004.003
Secondary IP Port Number	4672



IP Address	203.097.123.123
IP Port Number	4672
Secondary IP Address	110.035.004.003
Secondary IP Port Number	4673



IP Address	203.097.123.123
IP Port Number	4672
Secondary IP Address	000.000.000.000
Secondary IP Port Number	0

☑ They are all valid

□ A is not valid

□ B is not valid

□ D is not valid

Which of the following statements are true for ALL IP Monitoring Protocols?

□ No copper phone lines required

□ No copper phone lines required, displays additional, accurate information from site

□ No copper phone lines required, displays additional, accurate information from site, they are essentially 'always online'

☑ No copper phone lines required, they are essentially 'always online', alarms are transmitted instantly

Module 137: System Commissioning

What is the Usage tab used for?

☑ It shows which items are linked to the current item

□ It shows when a change was made to the current item

□ It shows the events associated with the current item

□ It shows which operator made a change to the current item

If an Output was on and I needed to know what turned it on, what would be the best way to figure this out?

□ Go to the Usage tab of the output

□ Use the find tool

□ Run a usage report

☑ Use the 'Load Events' function for the output

What is the best way to take information such as a list of inputs from the Protege GX databases for use in project documentation?

□ Run a report

□ Take a screenshot

☑ Use the Export Tool to create a CSV file

□ Take a database backup

The Protege Keypad can be used for which of the following things?

□ Viewing events

☑ Viewing events and changing the Controller IP address

□ Viewing events, changing the Controller IP address and changing PIN codes

□ Viewing events, changing PIN codes and programming users

Which of the following statments are true for the Protege GX Keypad?

□ The states of inputs, outputs and doors can be viewed

□ The states of inputs, outputs and doors can be viewed and doors can be controlled

□ The states of inputs, outputs and doors can be viewed and outputs can be controlled

☑ All of the above

Can a database that has been backed up from one server be restored to another?

□ Yes, any Protege GX database will work with any Protege GX Server

□ No, it can only be restored to the Server it was taken from

☑ Yes, as long as the Server is running the same or newer version

□ Yes, as long as the Server is running the same or older version

How do you upgrade a database after it is restored to a newer Server version?

☑ By running the software installer and choosing the repair option

□ It is not possible to restore an older database to a newer Server

□ The upgrade process must be completed using SQL Server Management Studio

□ The software will upgrade the database next time it is run

If a database has been restored from a different server, what additional step or steps must be taken to get the Server running?

□ Restart the PC

☑ Change the name of the Event Server and Download Server to match the PC name

□ Run the software installer to upgrade the database

□ Relicense the Server

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